May 28, 1956

How Responsibility Accounting Works . . . p. 32

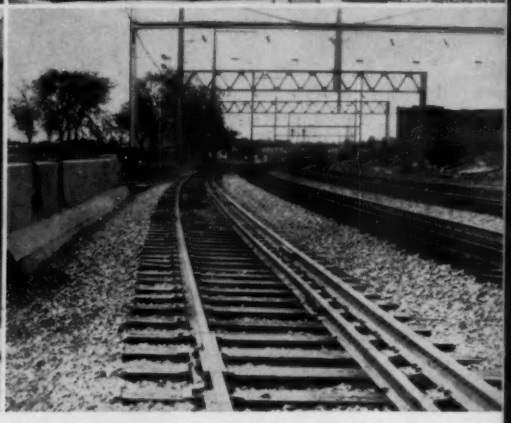
RAILWAY AGE

WORKBOOK OF THE RAILWAYS

THE INDUSTRY'S ONLY WEEKLY NEWSMAGAZINE

Pennsylvania Railroad Bridges Using Wrought Iron Deck Plates

Bladensburg Road, Washington, D.C.	2 Bridges
Arbutus, Maryland	1 Bridge
Sparrows Point Spur, Baltimore, Md.	3 Bridges
North Point Road, Baltimore, Md.	1 Bridge
Middle River, Maryland	1 Bridge
Queen Anne, Maryland	1 Bridge
Chester, Pa.	1 Bridge
Northampton, Pa.	1 Bridge
Linden, N.J.	1 Bridge
Mulberry St., Baltimore, Md.	1 Bridge
King of Prussia, Pa.	1 Bridge
Paoli, Pa.	3 Bridges
Jersey City, N.J.	2 Bridges
Exton, Pa.	1 Bridge
Wilmington, Del.	



Wrought Iron Deck Plates Increase the Life-Span of these Pennsylvania Railroad Bridges

The latest count shows that 21 Pennsylvania Railroad bridges in the Eastern Region are decked with wrought iron plates. A listing of these bridges, and four typical installations are shown above.

The selection of wrought iron plate for this service is sound engineering. Plates are subject to vibration and severe corrosive attack from coal and refrigerator car drippings and run-off water. The use of ballast makes it difficult for regular inspection and maintenance. It all adds up to the need for a material that can withstand corrosion forces and fatigue stresses. And wrought iron plate has a proved record of durability under these conditions. Too, it is easily fabricated . . . a plus value in deck plate installation. Riveted or welded, the plates form a long-lasting, water-tight coat over the entire bridge floor to protect structural members.

More information on this proved wrought iron plate application is in our bulletin, *Wrought Iron in Bridge Construction*. Write for your copy.

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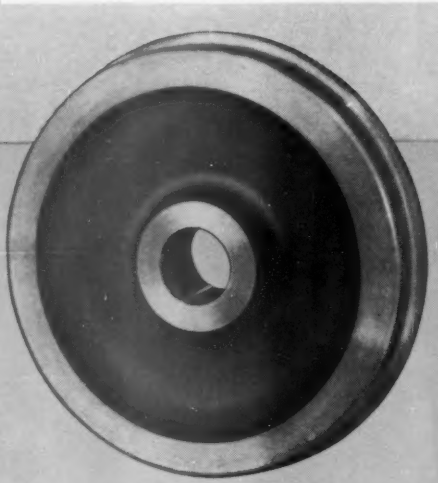

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Rolled Steel Wheels

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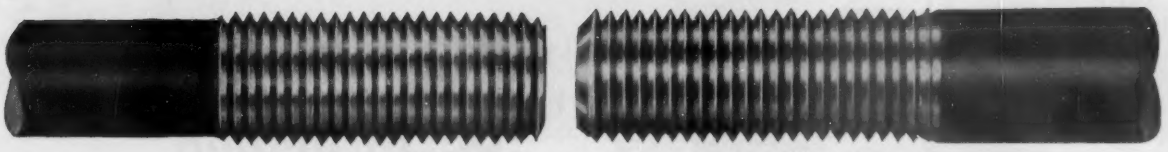
ROLLED or CUT THREADS?



Answers to questions we're often asked

Q. What is the important difference between cut and rolled threads?

A. A rod with a cut thread has an outside thread diameter which is the same as the body of the rod. Also, the end of the rod is usually pointed to remove the sharp starting thread.

Rolled threads have an outside diameter greater than the diameter of the portion of the rod next to the thread. And the end of the thread need not be pointed because a sharp starting thread is not present on a rolled thread.

Q. Which type of threads is better?

A. That's hard to say. But rolled threads are often the better choice. There are several reasons:

1. In many instances, rolled threads are cheaper. This is true because of the weight savings. You buy less steel. Also, rolled threads can often be produced faster. The savings to the customer on the larger sizes is often substantial.

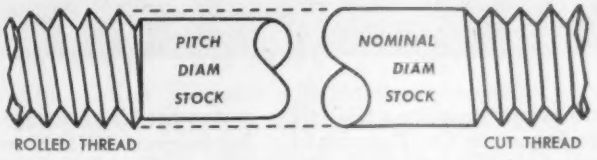
2. Rolled threads are likely to be smoother. And because cold-working hardens the threads, they are not as easily damaged. The cold-working also develops compressive stresses in the threads, making them more resistant to fatigue from repetitive stresses in bending or tension.

3. Because the thread-rolling process "cold-works" the steel in the threads, rolled threads have a slightly higher tensile strength than cut threads. This advantage, however, diminishes as the diameter of the rod or bolt increases.

Q. How can I be sure that rolled threads are the best choice for a particular application?

A. To learn the answer to this question, all you need do is get in touch with the nearest Bethlehem sales office. We'll be pleased to have one of our engineers call at your convenience, to study your bolting problem, and offer recommendations.

Here are the facts. The table below compares various standard rod sizes and shows the weight savings possible when rolled threads are used instead of cut threads.



COARSE THREAD Size	ROLLED THREAD STOCK diam in.	ROLLED THREAD WEIGHT lb/ft	CUT THREAD STOCK diam in.	CUT THREAD WEIGHT lb/ft	WEIGHT SAVINGS pct	STRESS AREA sq in.	MINIMUM BREAKING LOAD* lb
¼-20	0.213	0.121	0.240	0.155	**21.8**	0.0318	2050
⅜-16	0.330	0.291	0.365	0.358	**18.7**	0.0775	5050
½-13	0.445	0.529	0.490	0.647	**18.2**	0.1419	9200
¾-10	0.676	1.222	0.740	1.475	**17.1**	0.334	21700
1 - 8	0.908	2.196	0.990	2.640	**16.8**	0.606	39400
1¼- 7	1.144	3.504	1.235	4.110	**14.8**	0.969	63000

*Minimum breaking load for cut threads is based on ASTM Spec. A-306, Grade 65, which has a minimum tensile of 65,000 psi. Breaking loads for rolled threads of same grade will be about 5 pct higher. For other grades of steel, breaking load of cut or rolled threads is in proportion to the tensile strength of the steel.

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INSTALLATION OF CAR RETARDERS on curved track, an exclusive UNION feature, permits compact track layouts in limited yard areas . . . assures maximum classification track capacity.

All you have to do is see a UNION Electro-Pneumatic Car Retarder in action and you can quickly spot its advantages. Powerful air cylinders give it instantaneous operation, combining firmness and resilience. It maintains the desired braking pressure for any width of wheels regardless of brake shoe wear. Shocks are not transmitted back to electrical or mechanical devices, because of the cushioning effect of air.

Another *big* advantage is the saving in space. UNION retarders are made in 6 ft. 3 in. sections . . . each with its own power cylinder, brake beams and shoes . . . and can be installed on curves. Detector track circuits can be placed within the retarder, avoiding the use of extra lengths of track between switch points and the retarder.

Classification tracks can be made longer with the leads and switches grouped closer to the crest . . . and most important, less height is required for the crest and car speeds can be controlled properly with a minimum of retarder sections.

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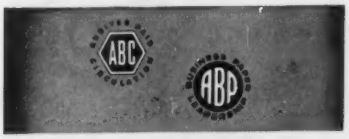

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Workbook of the Railways

Vol. 140, No. 22
May 28, 1956

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Week at a Glance

Upgrading of the box car fleet . . .

. . . is the order of the day, with first loadings of this year's grain crop in the Southwest scheduled to begin shortly. The car shortage, expected to be large, will call for widespread use of emergency upgrading materials. . . . p.7

How electronics cuts railroad costs . . .

. . . and also results in better inventory control, was the subject of an up-to-the-minute panel discussion at the annual meeting of the Purchases & Stores Division. . . . p.8

The union-shop provision . . .

. . . of the Railway Labor Act has been upheld in a unanimous decision by the United States Supreme Court. The court did not strike down state "right-to-work" laws, but it held that Congress had made a specific exception of the railroad industry, providing that the federal law there overrides the state laws. . . . p.12

FORUM: Coal traffic needs . . .

. . . in another 15 years will require a railroad investment of well over $1 billion in additional facilities. Where will the money come from? The coal industry's consistent opposition to freight rate modernization indicates a lack of understanding of coal's place in the railroad earnings picture. Here's a chance for the railroads to get in some effective public relations work. . . . p.31

Responsibility accounting . . .

. . . is the name for a common sense technique of preparing reports for supervisors, whereby each officer gets complete data about the operations he is responsible for, uncluttered by a lot of figures concerning things he can't do anything about. After a real test in the utility field, it is getting a trial on the railroads. . . . p.32

Shopping diesels when they need it . . .

. . . and not on a fixed schedule, is saving the Pennsylvania lots of lost engine-hours. Finding out when they need it is a

2.8¢ net profit per ton mile

...TO THE RAILROADS!

The railroadman who routes shipments by Rail-Seatrain-Rail is the man who's on his toes. He knows that routing by Seatrain will, on the average, more than double his profits per shipment. Net profits which average *2.8¢ per ton mile* are being realized by the railroads on Rail-Seatrain traffic between East and Southwest.*

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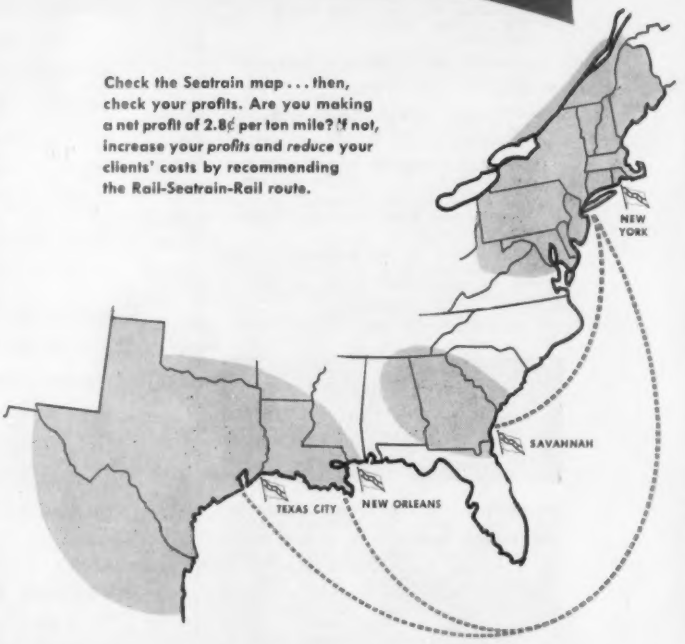
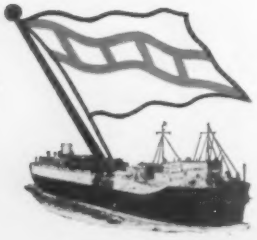
Check the Seatrain map... then, check your profits. Are you making a net profit of 2.8¢ per ton mile? If not, increase your *profits* and *reduce* your clients' costs by recommending the Rail-Seatrain-Rail route.





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Specific examples on request. Cost figure on I.C.C. basis, revenue figures actual.

Current Statistics

Operating revenues, three months	
1956	$2,535,561,742
1955	2,307,923,152
Operating expenses three months	
1956	$1,980,694,846
1955	1,767,777,513
Taxes, three months	
1956	$269,326,709
1955	242,996,101
Net railway operating income, three months	
1956	$218,900,246
1955	235,067,723
Net income, estimated, three months	
1956	$163,000,000
1955	176,000,000
Average price 20 railroad stocks	
May 22, 1956	104.52
May 24, 1955	94.56
Carloadings revenue freight	
Nineteen weeks, 1956	13,497,650
Nineteen weeks, 1955	12,563,112
Average daily freight car surplus	
Wk. ended May 19, 1956	6,894
Wk. ended May 21, 1955	14,131
Average daily freight car shortage	
Wk. ended May 19, 1956	6,679
Wk. ended May 21, 1955	6,552
Freight cars on order	
May 1, 1956	137,436
May 1, 1955	17,930
Freight cars delivered	
Four months, 1956	20,972
Four months, 1955	10,013
Average number of railroad employees	
Mid-April 1956	1,048,111
Mid-April 1955	1,011,753

RAILWAY AGE IS A MEMBER OF ASSOCIATED BUSINESS PUBLICATIONS (A.B.P.) AND AUDIT BUREAU OF CIRCULATION (A. B. C.) AND IS INDEXED BY THE INDUSTRIAL ARTS INDEX, THE ENGINEERING INDEX SERVICE AND THE PUBLIC AFFAIRS INFORMATION SERVICE. RAILWAY AGE, ESTABLISHED IN 1856, INCORPORATES THE RAILWAY REVIEW, THE RAILROAD GAZETTE, AND THE RAILWAY AGE GAZETTE. NAME REGISTERED IN U. S. PATENT OFFICE AND TRADE MARK OFFICE IN CANADA.

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Week at a Glance CONTINUED

laboratory job, based on spectrographic analysis of diesel lubricating oil. . . . p.34

Business writing can be a man trap . . .

. . . or it can be a way *to be a better supervisor.* Here's another article in the Railway Age series on that theme. . . . p.37

Class "A" box cars can be made in a hurry . . .

. . . when the need is acute, and here are some ways to accomplish it. . . . p.42

COMING: Next week . . .

. . . Highlights of one major railroad's active and growing research program.

BRIEFS

Passenger "deficit" was less in 1955 . . .

. . . according to the ICC formula, than in any previous year since 1950. The total deficit for Class I roads last year was $636.7 million. Watch Railway Age for figures for individual roads.

Too many passengers . . .

. . . is the number one problem of India's railroads. Reports from that populous country—not too well provided with roads—are that travel by rail must be cut if the growing freight business is to be handled.

PRR's "Aerotrain" will continue . . .

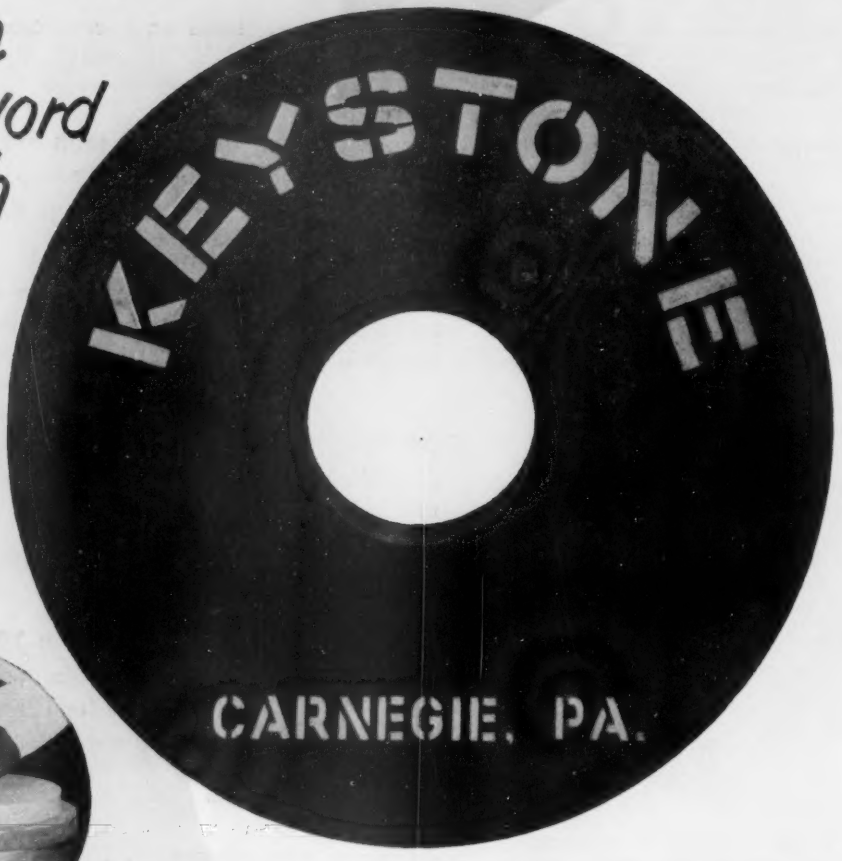
. . . its daily New York-Pittsburgh service until June 30. The original test period, to have ended May 25. was extended to gain "a more accurate estimate of passenger preferences for this type of lightweight equipment."

Trucker predicts T-O-F-C's rapid growth . . .

. . . "More than half the total freight transported by railroads and highways will move by truck-trailer by 1966," Thomas Robertson, executive director, American Trucking Associations, told the third annual Michigan Traffic and Transportation Conference at Michigan State University.

Quality and Service...

the watchword with



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NEW GRAIN CROP CALLS FOR MORE . . .

Upgrading of Box Car Fleet

Emergency measures are the order of the day—Search continues for car to double as handler of rough freight and yet remain Class A

First loadings of the new grain crop in the Southwest are scheduled for this week and railroads in that area are short of box cars for handling it.

While the crop is not estimated to be as heavy as the average of the last 10 years it's still sizeable. Opinions vary on whether or not this year will be another "greatest yet" in the box car shortage. However, the shortage will be large and, as one railroad officer put it, "it'll call for widespread use of emergency upgrading materials."

As an indication that this prediction is correct, one manufacturer of such materials told Railway Age its 1956 business was up 300% from 1955 levels. Several other manufacturers have indicated their sales are up sharply this year compared with 1955.

Grain shippers will not be the only victims if the expected car shortages develop. Increasingly, high-grade box cars are needed by other shippers to move their products. And almost as increasingly the supply of such cars is being filled by emergency upgrading or semi-permanent methods. This recurring expense, plus the bad railroad reputation the shortage of good cars generates, has led some roads to seek ways to end both troubles simultaneously. In effect, they have asked: isn't it possible to get a car which will handle rough freight and still remain fit, after cleaning, to handle grain and high-class freight?

With the help of suppliers, these roads seem to have been able to answer their own question in the affirmative, at least partially. At least two railroads are trying steel inner lining for box cars, with the lining covered by tough, abrasion-resistant neoprene. It could be that the wood-lined car may become a thing of the past.

In one way the nation's railroads as a whole have prepared themselves for handling the peak box car traffic of the coming months. On April 1, the percentage of bad-order plain and ventilated box cars had been lowered to 3.4% of box cars owned. For those railroads which will receive the initial impact of the heavy grain movement, the situation was even better.

However, those railroads figured — and the Car Service Division of the Association of American Railroads agreed — that they didn't have enough cars on line to handle the grain expeditiously. As a result the CSD put into effect on April 16 its Special Car Order 94, which directed other roads to send home empty, or load to the Southwestern roads, box cars owned by the eight lines which handle most of the early grain movement.

These lines are: Missouri Pacific; Rock Island; Katy; Santa Fe; Cotton Belt; Frisco; Union Pacific; and Burlington. Objective of the order is to give these railroads an on-line box car supply close to 100% of their ownership when the grain begins to move.

In the two weeks after the effective date of the order, spot checks by the AAR indicated that cars of the ownerships covered by Order 94 were moving home at a rate almost double similar movement in the two weeks before April 16. But, as a spokesman for one of the affected lines told our reporter, "it isn't enough. With grain loadings expected to start during the last week in May, we haven't been able (as of May 21) to accumulate a single car in anticipation of the grain movement. And in the two weeks before harvesting begins we'd like to have at least 500 cars in the area fit and ready to move the grain. However, we are fortunate in having some cars on line which now are handling stored grain. If we can keep them moving it'll help." Other grain

PLASTIC MATERIAL and fiber glass cloth are being used widely for patching holes in car lining and flooring as part of car upgrading program.

handling roads are in much the same position.

The same spokesman said that while his railroad was upgrading its own and foreign cars at the rate of 60 per day, it could and would double or treble this output if cars became available. But, he said, the railroad can't do much when about 35 cars a day are arriving, compared with almost 70 per day in 1955, when the grain crop was handled with relative ease. Consequently, he said, emergency upgrading will be the rule during the grain rush, and after.

As this issue went to press, latest available figures indicated that the average daily box car shortage for the U.S. was about 44% greater than at the same approximate date in 1955. For Western roads, the 1956 shortage was about 46% greater than at the same time last year. Thus, speedy car handling and upgrading is an absolutely necessary prelude to handling with reasonable dispatch the new grain crop, as well as the stored grain the Commodity Credit Corporation is shuffling around.

How Electronics Cuts Railroad Costs

Trend to mechanization, resulting in better control as well as lower costs, pointed up by panel discussion at P&S Division annual meeting in St. Louis

Electronic computers can provide more detailed and accurate purchases and stores information with fewer clerical employees. Computers can handle routine monotonous paper work at a fraction of the time now required.

These points were brought out in a panel discussion on Electronic Data Processing during the annual meeting of the AAR Purchases and Stores Division in St. Louis, May 16-18. The panel moderator was J. S. Fair, Jr., general purchasing agent, Pennsylvania.

Panelist B. E. Wynne, comptroller of the Western Maryland, told the group that his railroad experienced "tremendous" savings in force reduction over the past two years in programming and installing an electronic computer.

He also brought his listeners up to date on the WM's punch card purchase order system (Railway Age, Aug. 22, 1955, p. 34), with which, he said, the WM has been able to cut the cost of its purchase order forms from 15 or 20 cents each to only two cents. But most important, the road has been able to cut inventories because the time required to process orders has been substantially reduced. The WM has also been able to reduce clerical work in the purchases and stores department by paying all bills immediately upon receipt.

More than 60% of the 78 Class I railroads answering a special Purchases and Stores Division questionnaire reported they are mechanizing or are planning to mechanize their purchases and stores procedures. These 78 roads have in use or are planning to purchase seven large computers, 17 medium computers, and 27 small computers.

Control and economy stand out as the major reasons for mechanization, according to the study. The reasons reported for mechanization (based on 100%) are as follows: control, 31%; economy, 26%; speed, 15%; accuracy, 10%; and other reasons, 18%.

Carl E. Swanson

Alfred N. Laret

The panel discussion brought out that the following purchasing functions could be mechanized: ordering, analyzing prices, studying status of orders, analyzing performance of vendors, scheduling shipments, determination of the economical ordering quantity, and determining the order point.

The report of the Committee on Stores Procedures listed the following stores functions which have been mechanized on the 17 railroads that use machine accounting: (1) issues to shops and maintenance of way forces; (2) stock control programs; (3) recording material returned to stock by using departments; (4) preparation of classified balance sheets; (5) computing annual inventory; (6) disbursement documentation; (7) charges to shop orders; (8) tabulation of average prices; (9) price records; (10) printing stock record cards, sheets and bin labels; (11) control of surplus and obsolete materials.

Recognizing the growing importance of electronic data processing, the division's steering committee set up a new committee to study the subject and make its report at the next annual meeting.

"Key to the future is more progress," Clark Hungerford, president of the Frisco, told the purchases and stores officers. There is no reason to doubt that there are going to be more challenges in the years ahead than there have been in the past, he emphasized.

"It has been the factor of change and improvement . . . that has enabled the railroad industry to keep in step with a growing and ever-changing economy. It has also been the factor which has enabled us to withstand the impact of the competition we've had to meet in the past

(Continued on page 10)

RAILWAY MARKET OUTLOOK THIS WEEK

a RAILWAY AGE Workbook Page

Carloadings Up.—Loadings of revenue freight in the week ended May 19 totaled 778,997 cars, the Association of American Railroads announced on May 24. This was an increase of 1,391 cars, or 0.2%, compared with the previous week; an increase of 9,118 cars, or 1.2%, compared with the corresponding week last year; and an increase of 97,030 cars, or 14.2%, compared with the equivalent 1954 week.

Loadings of revenue freight for the week ended May 12 totaled 777,606 cars; the summary, compiled by the Car Service Division, AAR, follows:

REVENUE FREIGHT CAR LOADINGS
For the week ended Saturday, May 12

District	1956	1955	1954
Eastern	123,927	126,039	114,419
Alleghany	160,580	150,970	123,186
Pocahontas	63,274	60,920	47,818
Southern	130,931	117,762	115,960
Northwestern	124,093	121,154	113,282
Central Western	117,290	118,615	108,322
Southwestern	57,511	57,185	54,553
Total Western Districts	298,894	296,954	276,157
Total All Roads	777,606	752,645	677,540
Commodities:			
Grain and grain products	50,756	48,726	44,588
Livestock	6,747	7,276	7,708
Coal	139,781	122,801	104,081
Coke	13,315	11,625	7,179
Forest Products	45,454	44,553	40,711
Ore	86,006	74,002	66,977
Merchandise l.c.l.	60,336	61,527	61,451
Miscellaneous	375,211	382,135	344,845
May 12	777,606	752,645	677,540
May 5	770,558	736,904	647,954
April 28	778,398	725,900	647,925
April 21	763,437	701,432	626,182
April 14	742,053	670,304	612,884
Cumulative total, 19 weeks	13,497,650	12,563,112	11,781,714

In Canada.—Carloadings for the seven-day period ended May 7 totaled 87,241 cars, compared with 104,143 cars for the previous nine-day period, according to the Dominion Bureau of Statistics.

	Revenue Cars Loaded	Total Cars Rec'd from Connections
Totals for Canada:		
May 7, 1956	87,241	34,383
May 7, 1955	78,853	31,538
Cumulative Totals:		
May 7, 1956	1,394,917	634,210
May 7, 1955	1,239,698	565,184

Maintenance Expenditures

► *Up 12.6% in February.*—Expenditures for maintenance of way and structures in February were up 8.6% over February 1955, while spending for maintenance of equipment was up 15.4%, according to ICC's Bureau of Transport Economics & Statistics in report summarized below:

	February '56	February '55	% Change
Maintenance of Way & Structures	$103,643,712	$ 95,432,666	+ 8.6
Maintenance of Equipment	154,350,757	133,727,716	+15.4
Totals	257,994,469	229,160,382	+12.6

New Equipment

FREIGHT-TRAIN CARS

► *Canadian National.*—Ordered 50 refrigerator cars costing over $1,670,000, Marine Industries Ltd., with delivery scheduled for first quarter 1957; also ordered 10 cabooses costing $148,000, International Railway Car Company, to be delivered, for use on Grand Trunk Western Lines, in second quarter 1957.

► *Chicago Heights Terminal Transfer.*—Ordered 100 50½-ft box cars, Chicago & Eastern Illinois' Danville, Ill., shops; delivery scheduled fourth quarter 1956.

LOCOMOTIVES

► *Great Northern.*—Directors authorized purchase of 29 1,750-hp road switchers and five 1,200-hp switchers, estimated cost $6 million, for delivery second quarter 1957.

► *Units on Order Highest Since March '53.*—AAR reports units on order May 1 by Class I roads totaled 938, largest number on order in any month since March 1953; units on order May 1 included 911 diesel-electrics, 12 electrics, 15 gas turbine-electrics, compared with 355 diesel-electrics and five electrics on order May 1, 1955; Class I roads installed 535 new units—all diesel-electrics—in 1956's first four months, compared with 408 diesel-electrics and five electrics in comparable 1955 period; April installations alone totaled 136 units—all diesel-electrics—compared with 107 units in April 1955.

SPECIAL

► *New York Central.*—Installed two International Business Machines' 650 magnetic drum, high speed data processing machines at office of Detroit district auditor of expenditures; machines will be used initially to compute payrolls and payroll statistics for about 44,000 NYC employees west of Buffalo, N.Y.; NYC has two more IBM 650's on order, as well as an IBM 705 magnetic tape data processing machine.

New Facilities

► *Missouri-Kansas-Texas.*—Announced plans to develop 100-acre tract on outskirts of Tulsa, Okla., for industrial sites; Donald V. Fraser, Katy president, predicts Tulsa site will be nucleus of largest and finest planned industrial development in the Midwest.

Suppliers May Exhibit at Pan American Congress

Anthony F. Arpaia (left), chairman of the Interstate Commerce Commission, being sworn in May 15 as a member of the U.S. National Commission in the Pan American Railway Congress Association (Railway Age, May 21, p. 118). The oath of office was administered by H. Charles Spruks (right), acting chief of protocol of the Department of State. Looking on is William T. Faricy, chairman of the national commission and president of the Association of American Railroads. Some U.S. railway supply concerns are considering industrial exhibits at the congress, which is scheduled to meet in Buenos Aires, Argentina, in August 1957.

(Continued from page 8)

quarter of a century," Mr. Hungerford said. Purchases and Stores officers are in "an ideal position not only to buy—but also to sell—sell railroad transportation," he continued.

"Freedom of choice and the right to compete are fundamentals of the American way of life," Holcombe Parkes, president of the Railway Progress Institute, told the meeting. Mr. Parkes, addressing the annual luncheon, said "in transportation one does not have the right to compete or freedom of choice, because the fair share concept deprives a shipper of the most economical means of transportation." Mr. Parkes called for more suppliers to support the Railway Progress Institute.

For the second consecutive year, George M. O'Brien, stationery storekeeper of the Lackawanna at Scranton, Pa., was declared a co-winner of the annual essay contest conducted by the division. Richard P. Wachowiak, a stockkeeper of the Illinois Central at Chicago, was the other co-winner in the 1956 competition.

Both contestants presented their papers at the convention. Mr. O'Brien's paper was entitled "Training of Personnel in the Purchases and Stores Department." Mr. Wachowiak wrote on "Organizing a Control System."

C. J. Moisan, chairman of the Committee on Manual Rules and assistant to general purchasing agent, Illinois Central, reported that his committee had ready a draft of the revised manual.

The report of the Committee on Reclamation drew from the floor considerable discussion on the advisability of chrome plating crank shafts and other diesel parts. The committee reported that one railroad had discontinued the process temporarily. The Committee on Diesel Parts report indicated that railroads represented on the committee which chrome plate cylinder liners believe that plating extends the life of the cylinder liners three or four times.

New Officers.—Carl E. Swanson, assistant general purchasing agent of the Burlington, was elected division chairman to succeed Alfred N. Laret, vice-president-purchases and stores of the Frisco. J. S. Fair, Jr., was elected vice-chairman to succeed Mr. Swanson.

Chosen to fill vacancies on the division's General Committee were G. T. Wickstrom, general purchasing agent of the Union Pacific at Omaha, Neb., J. R. Clary, general purchasing agent of the Nickel Plate at Cleveland; H. Crouse, purchasing agent of the Texas & Pacific at Dallas, Tex.; E. A. Bromley, vice-president of the Canadian National at Montreal; and G. H. Bolton, director of purchases and stores of the Boston & Maine at Boston.

ICC Road Check Finds Defects in 90% of Trucks

A nationwide road check conducted by the Bureau of Motor Carriers of the Interstate Commerce Commission showed that 7,021 or 90.8% of the 7,734 interstate vehicles checked had one or more defects or deficiencies.

The five-day check by 131 district supervisors and safety inspectors of the bureau's field staff was made to obtain information for the commission on the extent of non-compliance with ICC safety regulations.

Each vehicle was checked for 58 possible violations.

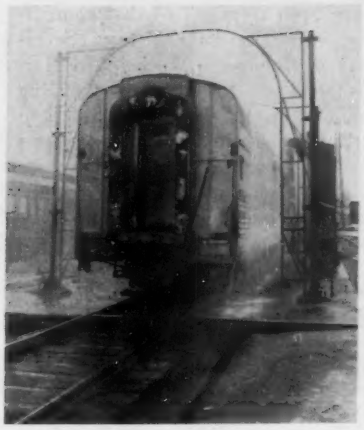
The bureau said that the relatively small number of vehicles checked and the random method of selection did not provide a true cross-section of the estimated 1,250,000 interstate trucks. It did find, however, that the study developed information as to leads for further investigation of carriers or classes of carriers which are permitting their trucks to operate in an unsafe condition or without proper regard for safety practices.

The bureau's data showed that 656 of the vehicles checked had defects in their service brakes and 1,142 vehicles had defects in the tubing or hoses leading to air brakes. Defective steering mechanisms were found on 415 vehicles and defective tires on 333 vehicles.

New Frisco Department To Coordinate All Others

A new department to devise ways and means of improving services and coordinating efforts of all departments has just been created by the Frisco.

Duties of the new unit, called the Industrial Engineering Department, will include planning of routine and scheduled maintenance for improved utilization of existing equipment, and study of new equipment to see if its purchase will be advantageous.



Cleans in 90 Seconds

A clean car in every ninety seconds can be achieved with new $92,000 train washing unit recently installed by Canadian Pacific at Toronto, though average rate is expected to be about 200 cars a day. Here, a car from "The Canadian" emerges from rinsing stage following soaping and scrubbing. Entire washer is 140 ft long, includes eight water towers, two detergent towers and six revolving brush units.

Canadian Roads Ask Freight Rate Boost

Canadian railroads, acting to offset rising costs of labor and materials, have petitioned the Board of Transport Commissioners for a general freight rate increase of 15%, and 25 cents a ton on coal and coke.

The application follows closely agreement by major roads with non-operating unions on a contract calling for a wage boost of 11% spread over the next 14 months, and welfare benefits making the increase an effective 20-cent "package" (Railway Age, May 21, p. 115).

Meanwhile, Canadian National announced it had reached a wage agreement with the Brotherhood of Locomotive Engineers which also calls for a total wage increase of 11% and, like the contract with the "non-ops," covers a two-year period.

The rate increase sought through the Railway Association of Canada on behalf of its member roads would yield an estimated $19.2 million in gross additional revenues to the Canadian Pacific, and $27.6 million to the Canadian National. However, the association contended, even these amounts would not meet rising operating costs resulting from the new wage and welfare agreements.

Using the Canadian Pacific as its "yardstick," the association stated that CPR's net railway income last year was $35,580,000 and is estimated for calendar 1956 at $34,500,000, based on "non-op" rises but not accounting for possible increases to be awarded to operating employees.

The last general freight rate increase was granted Canadian roads in 1953, when a 9% boost became effective January 1 and a 7% boost March 16.

Hood Backs Cabinet Report

President of American Short Line Railroad Association makes presentation at hearings before House Interstate Commerce subcommittee

A House Interstate Commerce subcommittee was advised last week of the American Short Line Railroad Association's position with respect to several provisions of pending bills to implement recommendations of President Eisenhower's Cabinet Committee on Transport Policy and Organization.

The advice was embodied in a statement by the association's president, J. M. Hood, at the hearing being held by the subcommittee which is headed by Representative Harris, Democrat of Arkansas. The Cabinet Report bills are H.R. 6141 and H.R. 6142, but the hearing also involves other pending bills to end special rates (so-called Section 22 quotations) to the government and to amend the Interstate Commerce Act's fourth section along lines recommended by the Interstate Commerce Commission.

The presentation of the Association of American Railroads was made at earlier hearings (Railway Age, May 14, p. 11). Generally, the AAR stressed only its desire for enactment of the "three shall nots," saying little about other proposals of the Cabinet Report. The "three shall nots" would prevent the ICC from considering the effect of a proposed rate on a competing mode of transportation.

President Hood of the Short Line Association also favored the "three shall nots," but he also dealt with other provisions of the pending bills with respect to which the member lines of his association had taken positions. "Basically," he said, "our member railroads seek equality of regulation and equality of opportunity for service by all forms of transportation."

As to the proposed new declaration of national transportation policy, Mr. Hood said a rewriting of the policy was desirable. At the same time, however, he wanted to eliminate any language calculated to put the policy declaration on a par with substantative provisions of the act. The substantative provisions "should not be 'construed' in the light of the policy declaration," he said.

As to the fourth section, the short lines favor repeal. Like the AAR, which also favors repeal, however, Mr. Hood suggested that the committee might well confine fourth-section changes at this time to those proposed by the ICC. The commission proposal, before the committee in a separate bill (H.R. 6208), would amend the section to permit railroads having circuitous routes to meet the competition of direct routes by publishing rates involving fourth-section "departures" without prior approval of the commission. This would limit the commission's fourth-section power to the matter of relief over direct routes.

The Cabinet Report bills contain a proviso which would give the ICC authority to override state commissions to permit abandonment of unprofitable services, a proposal which would be fought by railroad labor. Mr. Hood said the short lines favor the provision. The AAR's position was that consideration of the matter might well be deferred pending developments in the passenger-deficit investigation recently undertaken by the ICC (Railway Age, Mar. 26, p. 38).

Proposed changes in the act's through-routes provisions were appraised by Mr. Hood as being of "paramount importance" to members of his association. One such proposal would insert language prohibiting a carrier from cancelling a through route without the consent of

Jersey Traffic Men See Sights and Sites

Waiting departure of "Railroad Day Special" run recently by the Lackawanna to acquaint area traffic people and public officials with industrial potential of vicinity are H. L. Francis (left), eastern traffic and transportation manager, Koppers Company, and H. C. Schmidt, assistant vice-president, traffic, DL&W. About 400 persons toured nearby Lackawanna lines in "Phoebe Snow" coaches in conjunction with three-day program sponsored by Newark [N.J.] Railroad Community Committee. Commentary on uses of area along DL&W lines was "broadcast" to riders during trip.

all participating carriers, unless the commission, after hearing, authorized the cancellation. While supporting the "objective" of this provision, Mr. Hood suggested a substitute. He also said that Section 15(4) should be amended to remove the "presently effective restriction" upon the power of the ICC to prescribe through rates and joint rates "when it finds them to be in the public interest."

If these through-route changes are made, Mr. Hood said, the short lines would have no objection to the proposed changes in tariff-suspension procedure, which would include shortening the suspension period.

As to Section 22, Mr. Hood said the short lines are divided on the matter of repeal, but they are united in their view that Section 22 quotations should be published and that the government should be precluded from assailing them in reparations cases.

Mr. Hood was preceded by James F. Pinkney, general counsel of American Trucking Associations, who completed the ATA presentation begun at hearings held two weeks earlier (Railway Age, May 21, p. 8). Questions asked Mr. Pinkney by Chairman Harris pointed up the latter's concern about situations wherein present regulatory policies might require carriers to keep their rates higher than would otherwise be necessary, thus depriving shippers of the benefits of low-cost transportation. Mr. Pinkney defended such regulatory practices as necessary to keep the country's transportation burden "properly" distributed as between high and low rated traffic.

Chairman Harris also noted that the most ardent advocates of the Cabinet Committee recommendations have been members of that committee, especially its chairman, Secretary of Commerce Weeks. Mr. Harris went on to speculate that the cabinet group might not feel too happy about its failure to get as much support as it might have expected from some segments of the transport industry.

STATE BUYING CA&E?

Possibility that the Chicago, Aurora & Elgin might be sold to the state of Illinois for as much as $6 million developed last week.

In discussing plans for construction of a superhighway, Governor W. G. Stratton revealed plans in which the CA&E would sell certain property rights to the state for $6 million to provide right-of-way. In turn, the CA&E would grant an option to the state to purchase the railroad for a price somewhere between 4 and 6 million dollars.

The option would run to March 1, 1957, and the road would, meanwhile, spend $1 million to improve and coordinate its passenger service with the Chicago Transit Authority.

Union Shop Upheld By Supreme Court

The Railway Labor Act's union-shop provision has been upheld by the United States Supreme Court.

The court did not strike down state "right-to-work" laws such as the Nebraska statute which was the basis of the case before it. It held in effect that, Congress having occupied the field as to the railroad industry, the federal law there overrides the state laws.

The case came up from Nebraska courts which held that enforcement of a union-shop agreement between the Union Pacific and unions representing its non-operating employees was not permissible under that state's "right-to-work" law (Railway Age, July 25, 1955, p. 10). Brought by UP employees, who were not members of any union and did not desire to join, the case was docketed in the Supreme Court as No. 451, *Railway Employees Department, American Federation of Labor, et al., v. Hanson, et al.*

The RLA provision at issue was added in 1951. It provides that, notwithstanding the law of "any state," a carrier and labor organization may make an agreement requiring all employees within a stated time to become a member of the labor organization, provided there is no discrimination against any employee and provided that membership is not denied nor terminated "for any reason other than the failure of the employee to tender periodic dues, initiation fees, and assessments (not including fines and penalties) uniformly required as a condition of acquiring or retaining membership."

The Supreme Court's reversal of the Nebraska court was a unanimous decision, announced by Justice Douglas. A separate concurring expression came from Justice Frankfurter.

The court's refusal to strike down the "right-to-work" laws was emphasized in the majority opinion by

this statement: "In the absence of conflicting federal legislation, there can be no doubt that it is within the police power of a state to prohibit the union or the closed shop."

The court then added that "the power of Congress to regulate labor relations in interstate industries is likewise well-established." It continued:

"Industrial peace along the arteries of commerce is a legitimate objective; and Congress has great latitude in choosing the methods by which it is to be obtained. The choice by the Congress of the union shop as a stabilizing force seems to us to be an allowable one. Much might be said *pro* and *con* if the policy issue were before us . . . But the question is one of policy with which the judiciary has no concern. . . ."

As to the assessments which may be imposed by unions, the court found that such required financial support relates to the work of unions "in the realm of collective bargaining." It went on to say that if assessments are imposed for other purposes, "a different problem would be presented."

And it also said the present determination "will not prejudice the decision" in such a case—if it should arise.

"For," the court added, "we pass narrowly on Section 2 Eleventh of the Railway Labor Act. We hold only that the requirement for financial support of the collective-bargaining agency by all who receive the benefits of its work is within the power of Congress under the Commerce Clause and does not violate either the First or Fifth Amendments. We express no opinion on the use of other conditions to secure or maintain membership in a labor organization operating under a union or closed shop agreement."

Meanwhile, Railway Age asked Jonathan Gibson, vice-president and general counsel of the Santa Fe, how the court's decision in the Nebraska case would affect the *Sandsberry vs. National Association of Machinists* case now before the Texas Superior Court (Railway Age, Feb. 15, 1954, p. 7). He said, "the issues are the same for both cases and the decision will of course affect our case, which has been held up pending a decision in the Nebraska case. We will, however, continue to press our case forward."

Passenger Men Appraise Lightweights

Operation of the Pennsylvania "Aerotrain" between New York and Pittsburgh, has produced average train-mile revenue of $2.45 — a figure that is low because of family fares and special 30-day coach fares in effect between Philadelphia and Pittsburgh.

The Rock Island's "Jet Rocket," on the other hand, has been averaging around $3.70 per train-mile on its 161-mile run between Chicago and Peoria, Ill. The out-of-pocket cost of operating this train has averaged some 60 cents less per train-mile than the former "Peoria Rocket."

Facts like these about lightweight-train operation highlighted the recent Chicago meeting of the American Association of Passenger Traffic Officers. Interest at the meeting centered around performance and operation of the new trains; and officers of railroads with such trains gave frank appraisals of results so far.

Rocket Talk—I. C. Bruce, general passenger traffic manager of the Rock Island, told AAPTO members that the load factor on his road's "Jet Rocket" has been running "neck and neck" with the train it displaced.

Mr. Bruce said that while there has been some criticism of the train's ride, as might be expected, he feels the new lightweights are "a step in the right direction." He said rider reaction to one "extra" on the "Jet Rocket" — lounge-car television—has been enthusiastically received. This TV "looks ahead" of the moving train through a camera in the locomotive. (Railway Age, Feb. 6, p. 7, and Mar. 19, p. 8).

The first-class parlor car on the "Jet Rocket" has been discontinued, Mr. Bruce added. Among other things, he said, the car did not offer the privacy of its counterpart on the former "Peoria Rocket." He added that his road has since been studying the possibility of placing a new parlor car unit at the rear of the train.

PRR Experience—S. W. Seeman, passenger sales promotion manager of the Pennsylvania, said his road surveyed riders on the New York-Pittsburgh "Aerotrain" for three weeks in March. Of those responding to the postcard survey, 88.5% said they planned to ride the same train again, Mr. Seeman reported.

As to the quality of the train's ride, 80.5% of the respondents said they enjoyed the trip, 7.7% gave a mixed reaction, and 11.8% were dissatisfied. Nearly 83% of these passengers were traveling more than 100 miles.

Passengers who complained about the train's ride, Mr. Seeman said, commented most often on "bumpy riding" and wheel noise.

Mr. Seeman said the serving of hot tray meals at the seats in the first two cars of the "Aerotrain" has been "pretty well received." Food in the other seven cars is dispensed by vending machines.

Since the PRR initiated its "Aerotrain" experiment on Februray 26, the low-slung train has averaged around 200 passengers per trip, Mr. Seeman continued. He said the train has had "almost perfect on-time performance" on its 7½-hr, 11-stop schedule.

More news on page 16

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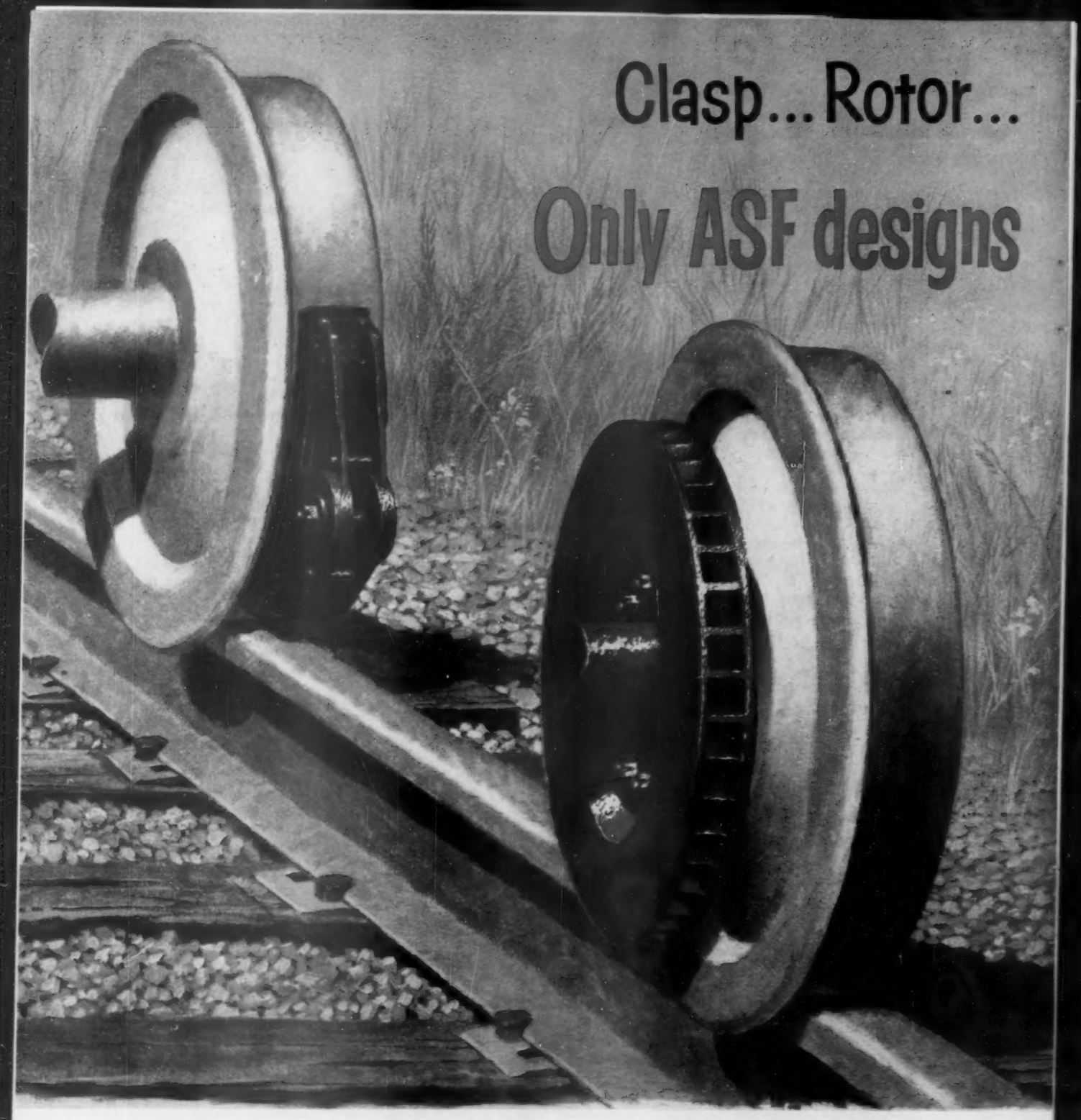

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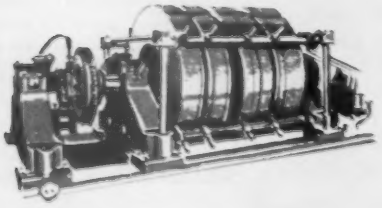
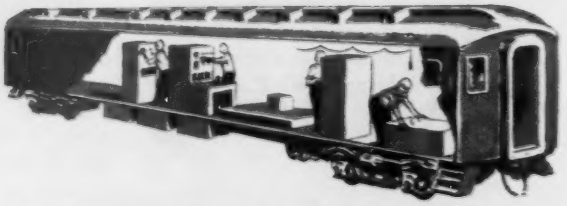


ASF Brake Test Dynamometer permits close-range laboratory study of braking action . . . This unique machine can duplicate the stresses and kinetic energy of stops from 150 mph on down—service or emergency—as well as low or high speed drags.



ASF Brake Test Car furnishes final, on-line proof of brake design and brake performance . . . Over 1800 brakeway stops have been made to date with this ASF car—fitted at various times with ASF clasp, rotor and combination brakes.

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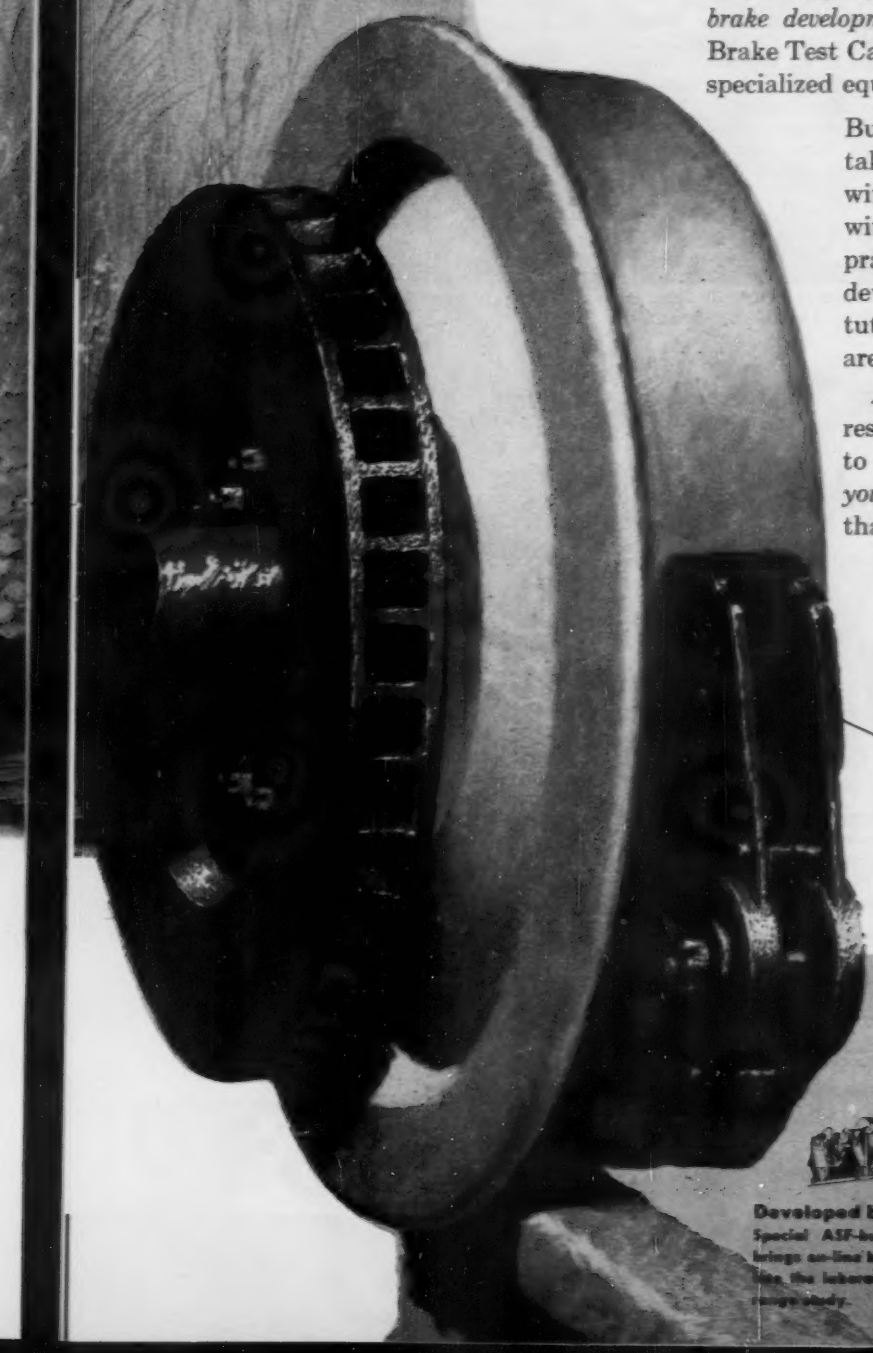
Railroad men may well ask why only one company—American Steel Foundries—is prepared to build any type of brake.

The answer is *experience*. Not just the experience of *building* brakes for 35 years, but the kind that comes from being the only company equipped to do a thorough, objective job of *brake development*. The Brake Dynamometer and the ASF Brake Test Car, shown on the opposite page, are typical of the specialized equipment it takes to do that job.

But it takes more than specialized equipment. It takes men with the skill to design such equipment, with the technical background to use it properly, with the experience to interpret research data in practical terms. There's no easy way to design and develop many different types of brakes; no substitute for testing each brake under conditions that are identical with on-line train operation.

Ask your ASF Representative to show you the results of these on-line tests. That's the sure way to find the type of brake with the characteristics *you* want. Only at ASF can you *choose* the brake that's right for your road.



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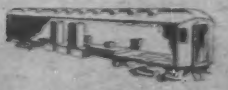

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Organizations

Forest Products Research Society.—Ralph H. Bescher, manager, Wood Preserving Division, Koppers Company, will be installed as president at the 10th annual national meeting in Asheville, N. C., June 4-8.

Transportation Association of America.— Will hold the second of its 1956 series of transportation institutes at Cleveland June 6. Fred C. Foy, president of Koppers Company, will be main speaker. Paul W. Johnston, president of the Erie, will give the railroad point of view in a discussion of the institute theme "Transportation Future Unlimited."

Supply Trade

Herbert H. Rogge, formerly president of **Canadian Westinghouse Company,** has been appointed executive vice-president, American Car & Foundry Division of **ACF Industries, Inc. W. E. Crawford** has been named Pacific Coast sales representative of the division, in addition to being sales representative for Shippers' Car Line Division.

Crucible Steel Company has formed a new Spring Division as a separate unit within the company, which combines all previously existing spring fabrication and sales activities. **Thomas T. Crowley** has been made general manager. **William Krepps** continues as manager of sales of the railway spring department.

EARL M. ALLEN, who has been appointed chief signal officer, Railroad Division, Federal Telephone & Radio Co. For the past year Mr. Allen has been chief consulting engineer for Mass Transportation Consultants, before which he was head of the centralized traffic control division, Union Switch & Signal Division of Westinghouse Air Brake Company.

Railway Officers

ASSOCIATION OF SOUTHEASTERN RAILROADS.—Joseph H. Reynolds, Sr., office manager, appointed secretary; **John P. Cole,** statistician, named senior statistician and **Robert L. Cornelius,** assistant statistician, appointed statistician, all at Washington, D. C.

CHICAGO, AURORA & ELGIN.—John F. Quinn, general agent at Wheaton, Ill., appointed freight traffic manager there, succeeding **Ralph P. May,** elected vice-president—freight traffic.

ILLINOIS CENTRAL.—Albert Blankinship, master mechanic, Kentucky division at Paducah, Ky., has been transferred to the Iowa division at Waterloo, Iowa, succeeding **Earl L. Walston,** who has become general superintendent of motive power and machinery of the Chicago & North Western. **Robert E. Wittaker,** master mechanic of the Paducah Shops, succeeds Mr. Blankinship.

Walter N. Crane and **Thomas C. Davidson** have been appointed assistant general freight agents, both at Chicago.

John M. Trissal, assistant chief engineer, advanced to chief engineer, effective May 1. **Charles H. Mottier,** vice-president and chief engineer, will continue as vice-president in charge of engineering. **James B. Schaub,**

John M. Trissal

assistant engineer of buildings, appointed engineer of buildings at Chicago, succeeding **B. M. Murdoch,** deceased. **Isaac G. Forbes,** designer, replaces Mr. Schaub.

MIDLAND CONTINENTAL.—Marshall O. Culton appointed general agent at Seattle, Wash.

MONON.—Donald H. Lange appointed freight and passenger traffic agent at Milwaukee, to succeed **Kenneth C. Schaefer,** promoted.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—A. J. Becker appointed freight traffic representative at St. Louis.

BESSEMER & LAKE ERIE.—Roy C. Beaver, general manager at Pittsburgh, elected also vice-president.

NEW YORK, ONTARIO & WESTERN.—Russell E. Lewis appointed general agent at Birmingham, Ala.

NICKEL PLATE. — Myron B. Phipps, general manager at Cleveland, has been named vice-president—operation, succeeding **J. C. Wallace,** retired.

Myron B. Phipps

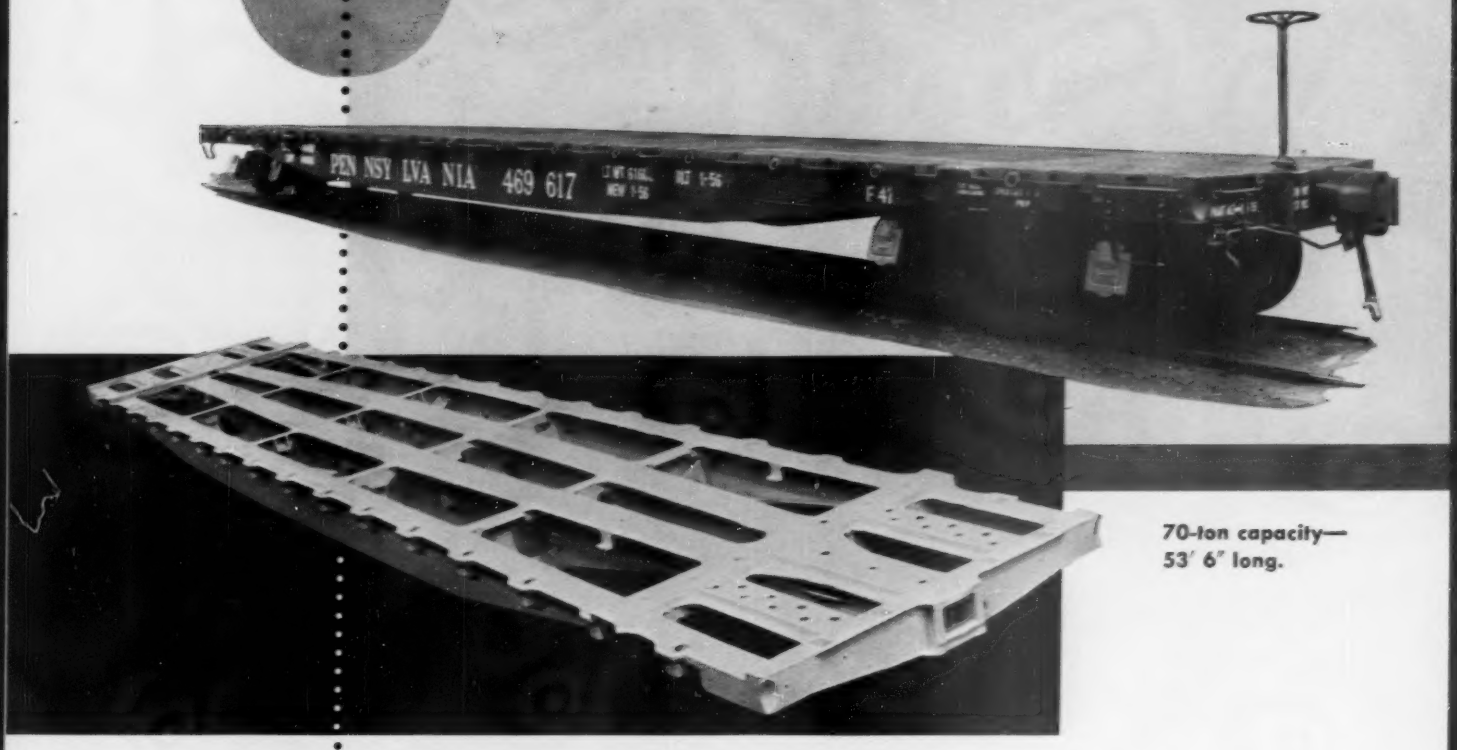
H. A. Gilmore has been appointed general agent at Davenport, Iowa, succeeding **Fred R. Baker,** transferred to New York to replace **Kenneth B. Chilcot** (Railway Age, April 23, p. 40).

PENNSYLVANIA.—Warren R. Elsey, assistant vice-president, purchases, stores and insurance since 1944, appointed vice-president, purchases, stores and insurance, effective June 1, to succeed John C. White, who is retiring.

OBITUARY

Howard C. Walker, 52, assistant general freight agent of the **Milwaukee** at Chicago, died May 20.

look at the record...



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53′ 6″ long.

P.R.R. Orders Commonwealth Cast Steel Underframes for 700 More Flat Cars

In 1934-5 the Pennsylvania Railroad built 1,500 new flat cars equipped with Commonwealth one-piece underframes. *All of these cars are still in active service*—an unusual record for flat cars. Since that time, additional lots of new flat cars have been similarly equipped, and 700 more are now on order. The record of highly satisfactory performance of the original lot of 1,500 cars justified the subsequent orders for Commonwealth Underframes.

The well designed cast steel underframe permits better distribution of metal with uniform strength throughout, eliminating stress concentration. Minimum weight is assured.

Thousands of flat cars with cast steel underframes in service on 15 leading railroads are proving their exceptionally long maintenance-free life and the sound economy of the investment they represent.

Plan wisely for the future—invest in Commonwealth one-piece underframes.

GENERAL STEEL CASTINGS

GEARED TO PROGRESS
P R I
MEMBER

GRANITE CITY, ILL. EDDYSTONE, PA.

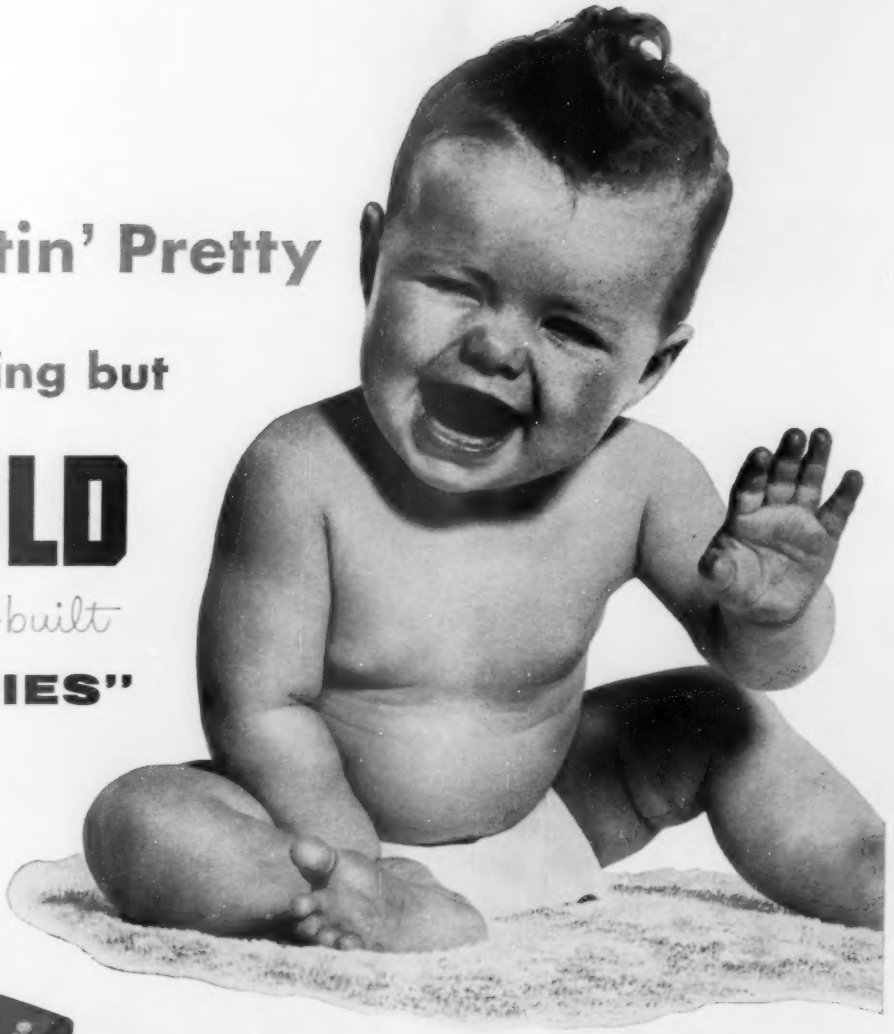
"I'm Sittin' Pretty

use nothing but

GOULD

Research-built

BATTERIES"



America's Finest!
GOULD KATHANODE
BATTERIES
for Air Conditioning
and Car Lighting

There are three big reasons why it pays to choose Gould Research-Built Batteries:

1. They are the finest batteries modern science can give you—research-built for longest service life.
2. Strategically located Gould plants assure prompt attention to your battery requirements.
3. Gould Field Engineering Service, finest in the industry, nation-wide in scope, is as close to you as your telephone, always ready to see that your batteries are properly cared for and maintained . . . that you get maximum battery performance.

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Always Use Gould-National Automobile and Truck Batteries

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"BETTER BATTERIES THROUGH RESEARCH"

©1956 Gould-National Batteries, Inc.

They snap-on—and stay on—

WABCO® Dated Packing Cups

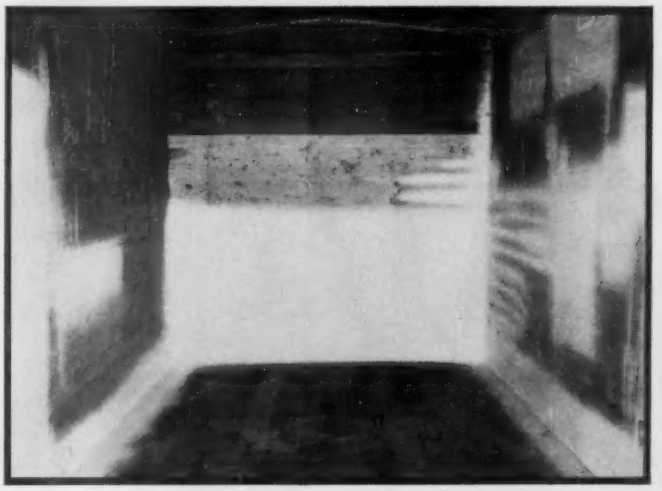
"Quick" and "Easy" are the words for WABCO Packing Cups. At the regular cleaning time, you snap them off, clean them and snap them on again. It is not unusual for these cups to provide satisfactory service for two or more cleaning periods under normal wearing conditions. Their high resiliency assures continuous cylinder wall contact with minimum leakage.

When you replace brake cylinder packing cups, seals and gaskets, be sure to specify the original brand, WABCO, and you'll get the same long service, time after time. The date of manufacture, mold number and piece number are molded into every part.

Westinghouse Air Brake
COMPANY
AIR BRAKE DIVISION WILMERDING, PENNA.

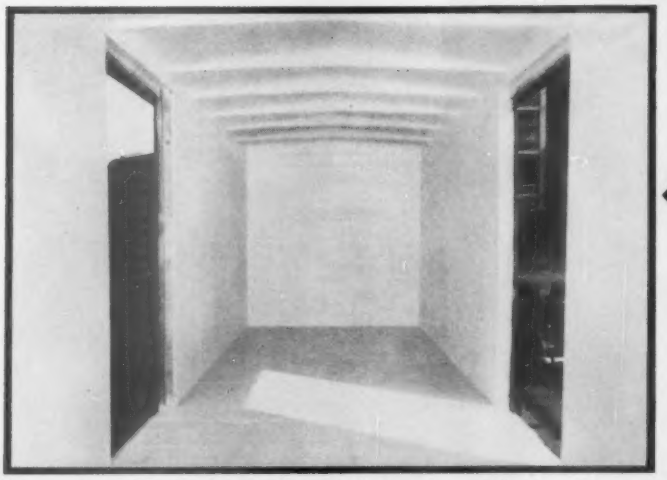
TOUGH, LONG-LASTING UPGRADES CARS FAST

These actual jobs demonstrate the quality and versatility of Railroad Cocoon



Fast, Long-Lasting Upgrading

Just two men, using standard spray equipment, upgraded this box car from Class "C" to Class "A" in just 27 minutes with Railroad Cocoon. More and more roads are using this system to meet peak demands for high grade cars. It is not necessary to spray the entire interior of cars—only those areas needing repair. Notice the smooth, leak-proof repairs made in the freight car above. With Railroad Cocoon, upgrading can be quickly accomplished in any location—at the shop or at distant points throughout the system where cars may be needed immediately.



Rapid, Economical Lining

Here is the best way to get a completely tight car for shipment of bulk commodities and to protect the lading from contamination, insect infestation and moisture damage. With Railrood Cocoon, cars can be completely lined and ready to roll in 6-8 hours. This fast, economical lining system prevents loss in transit of such materials as grain, sugar, flour, china clay, potash, silica sand and other fine substances. Its smooth, safe surface eliminates torn bags and other cargo damage.

®Cocoon is a registered trademark of R. M. Hollingshead Corporation.

Upgrade all your freight cars with Hollingshead Railroad Cocoon—no ordinary coating

RAILROAD COCOON®

...AT FAR LESS COST!

Increase profits by reducing losses... make existing equipment more valuable

Roads find new profits in hauling with Railroad Cocoon upgraded cars. Sifting losses are eliminated, damage claims reduced and customers get better and faster service. The low cost of a Railroad Cocoon upgrading is quickly amortized—no need to shop cars . . . no need to keep them out of service for long periods of time . . . no need for special help, present maintenance crews can do the job. Its value in good will and customer relations can never be measured.

Railroad Cocoon is easily applied, is tough, strong, flexible and adheres to any grease-free surface. It is a sanitary white and can be washed or steam cleaned. It does not support combustion and is safe for hauling flour, grain, powdered milk and other foodstuffs.

Railroad Cocoon is the famous son of a famous father—the remarkable "Cocoon" that moth-balled our warships and aircraft after the last war, specially developed for our government by R. M. Hollingshead Corporation, leader in sprayable plastics. In Railroad Cocoon you get all this **product experience** and **unequalled leadership.**

*Railroad Cocoon is the **ORIGINAL** and **BEST** upgrading material*

COMPARATIVE TESTS SHOW THE DIFFERENCE

PRODUCT CHARACTERISTICS	RAILROAD COCOON	PRODUCT "B"	PRODUCT "C"	PRODUCT "D"
ADHESION	*Excellent*	*Poor*	*Excellent*	*Excellent*
LOW TEMPERATURE FLEX	*Excellent*	*Good*	*Poor*	*Poor*
LOW TEMPERATURE IMPACT	*Excellent*	*Fair*	*Poor*	*Poor*
ELONGATION	*Excellent*	*Good*	*Poor*	*Poor*
SPECIAL PREPARATION OR MIXING	*None*	*None*	*Yes*	*Yes*
COMBUSTION SUPPORTING	*No*	*Yes*	*Yes*	*No*
POT LIFE	*Excellent*	*Excellent*	*Poor*	*Poor*

can handle all these jobs!

Distributed for the R. M. Hollingshead Corporation by

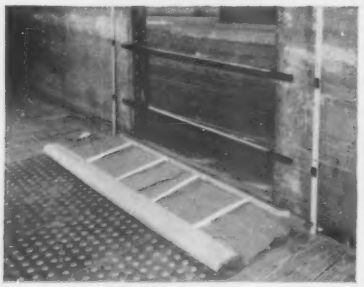
Brandon

EQUIPMENT COMPANY, INC.

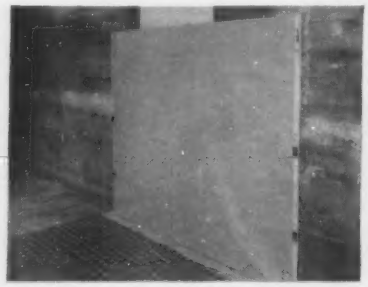
332 South Michigan Avenue, Chicago 4, Illinois

NEW STEEL-BRACED GRAIN DOOR stops bulge and car door strain!

Acme Steel design holds load firmly and safely—reduces damage to doors and posts



Grain door in position, ready for erection, with steel beams nailed in place.



Door in position, with lath nailed on either side. Ready for use.

Read the reasons why these new Acme Steel reinforced grain doors out-perform ordinary paper and wood doors—cut load and equipment losses:

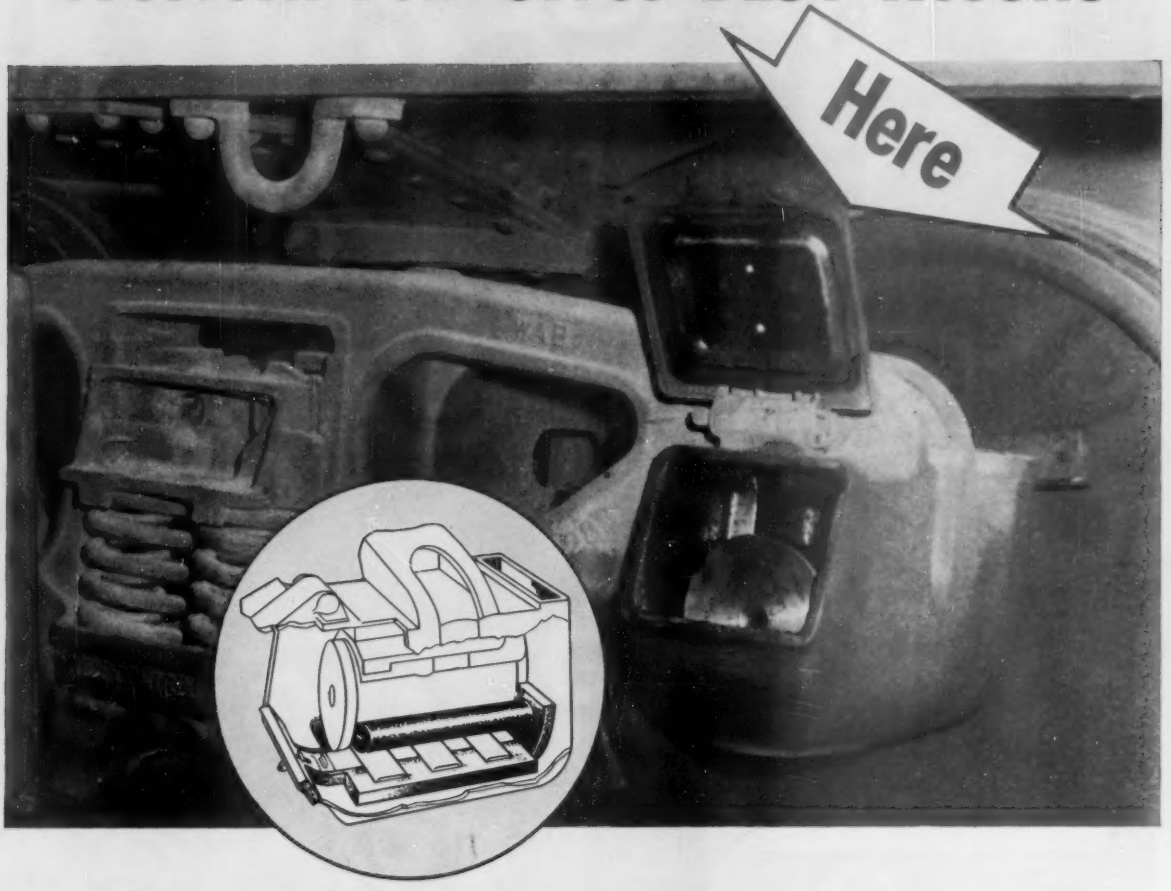
1. Each door uses only *5 nails* per post—cuts damage.
2. In addition to steel beam and steel slat bracing, door is made of high quality reinforced paper.
3. No strain on car door—2 steel beams stop excess bulge.
4. One man can cooper a car (2 doors) in 10 minutes.
5. Steel beams re-usable.
6. Made in 2 heights for regular 6-foot opening and will be available in 2 heights for wide doors.

An **A**cme **I**dea **M**an will give you a full demonstration whenever and wherever you want it . . . and satisfy your urgent need for a better grain door. Folder with complete information now available on request. And ask to see our new motion picture—get the facts *in action!* Write or phone Dept. R.

ACME STEEL COMPANY ACME STEEL

2840 ARCHER AVENUE, CHICAGO 8, ILLINOIS

Western Felt Gives BEST Results



SUPERIOR OIL-CONDUCTIVITY AND WEAR RESISTANCE OF FELT + **PROPER ENGINEERING EXPERIENCE AND SOUND DESIGN** = **An Economical Long-wearing Trouble-Free Journal Lubricator**

Fullo Corporation, Chicago, Manufacturer of the Jeffers Journal Lubricator, a pioneer in the field, reports gratifying results over the years in actual road service operations in all parts of the United States, Canada, Mexico and Alaska.

In a controlled test, 100 refrigerator cars operated over 107 railroads in interchange by Wilson & Co. equipped with Jeffers Journal Lubricators averaged 732,817 miles per cut journal compared to 63,376 miles when waste packed.

This astonishing performance is standard with the Jeffers Journal Lubricator and points up the efficiency of Western Felt in this application. Fullo has checked lubricators in service for five and more years and found no appreciable wear.

Investigate felt for this purpose; felt feeds clear, filtered oil to the bearing evenly. Its live wool fibers never ravel or fray. No loose ends. No glaze. Felt resists wear, age, weather.

There's a Western Felt engineer near you to serve you. Write today and we'll put him in touch with you immediately.

WESTERN Felt WORKS

4021-4139 Ogden Ave
Chicago 23, Illinois
Branch Offices in Principal Cities

MANUFACTURERS AND CUTTERS OF WOOL FELT

		119 CF&I 1190 RAIL	115RE
Height		6 13/16"	6 3/4"
Head	Depth	1 7/8"	1 11/16"
	Width	2 21/32"	2 23/32"

Fishing and Base Dimensions of 119 CF&I and 115RE are identical.

JOINTS FOR 119 ALSO FIT 115RE.

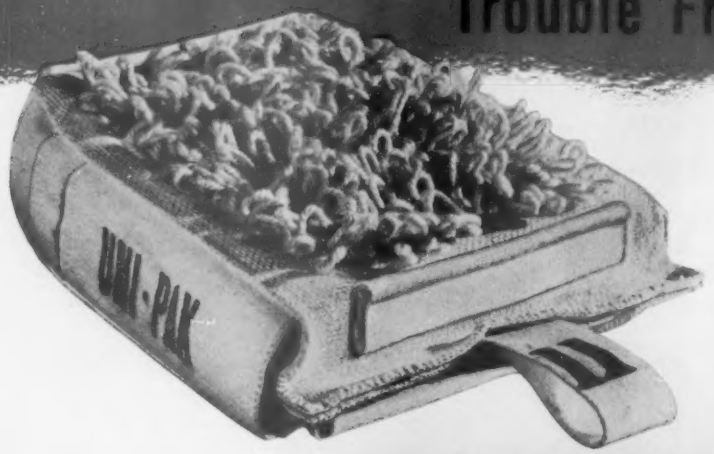
Rio Grande
SPECIFIES NEW SECTIONS

The Rio Grande, "MAIN LINE THRU THE ROCKIES", was added to the list of prominent Western Railroads which have adopted the 136, 119 and 106 pound CF&I new rail sections. This acceptance is further evidence of the confidence being placed in these new CF&I sections by Western Railroad engineers.

In 1882, CF&I rolled its first rail for the Rio Grande. CF&I is justly proud of the many years of close relationship with the Rio Grande and the part it is playing in the modern progressive program of this outstanding railroad.

America's Best-Loved Travel Wonder—the Royal Gorge—is the scenic highlight of one of Rio Grande's two routes through the heart of the Rockies. Canyon walls only 30 feet apart support the track over the river on the famous hanging bridge. More than 1,000 feet above, the world's highest bridge spans the narrow chasm.

UNI-PAK® *the proved performance* LUBRICATOR *with a high record of* Trouble Free Car Miles



Only Uni-Pak combines the quality advantages of wicking yarns and neoprene

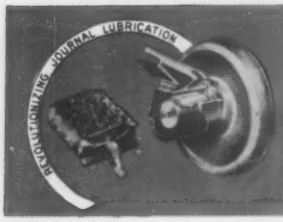
Exclusive UNI-PAK Features

1. Specially developed lubricating yarn sewn continuously through three inches of foam neoprene and terminating in non-glazing loops at top and bottom.
2. Uni-Pak's foam neoprene pad absorbs and holds more oil than other lubricators, giving maximum filtered oil to the journal.
3. Rugged cotton body increases capillary attraction. Buffers keep pad properly positioned and take up wear at fillet and collar.

145,000 UNI-PAK LUBRICATORS

now giving remarkable service on 30 roads

Write for full details about this revolutionary lubricator today



UNI-PAK CORPORATION

BOX 8302 SWISSVALE, PA.

366 MADISON AVE., New York 17, N. Y. • 120 SO. LA SALLE ST. Chicago, Ill.

Honeywell's new

Automatic Temperature Control for mechanical refrigerator cars!

Gives you the most dependable and accurate control of temperature —and you save on installation, operation, maintenance!

IN THE course of a single trip, refrigerator cars carry frozen foods or fresh produce through extremes of heat, cold and humidity. Yet, in mountain country or desert—car temperature must remain constant. This means precision cooling in some cases—heating in others.

The Trane Company installation for the Santa Fe solved this control problem with Honeywell's electronic control system. The system maintains the exact temperature required—and does it automatically. It controls both the heating and the cooling of cars dependably, accurately, and safely.

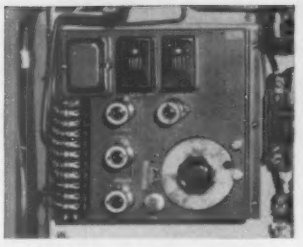
The Honeywell Temperature Control System is easier to install, too. No complicated tubes wind through car ceilings or walls. Only one simple sensing element is used in the entire system.

Service and maintenance costs are lower because of complete accessibility.

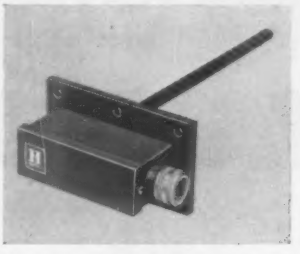
Honeywell Electronic Temperature Control is also the simplest system to operate. The easy-to-read, one-dial control panel (see illustration) indicates temperature settings. Yard personnel can check or change setting without complicated instruction or training.

So if you're planning to build, buy or convert mechanical refrigerator cars—do as many other operators have done—specify proven *Honeywell* Electronic Temperature Control.

For complete information on the Honeywell Electronic Temperature Control, write to Honeywell, Dept. RA-5-111, Minneapolis 8, Minnesota.



Control panel for car interior type of installation provides "fingertip control," easy-to-read dial, divided into fresh and frozen food ranges.



Rugged Space Thermostat with sensing element can be mounted within the refrigerated space or in the return air duct. Electronic sensitivity makes it accurate to within a small fraction of a degree.

MINNEAPOLIS
Honeywell

112 OFFICES ACROSS THE NATION

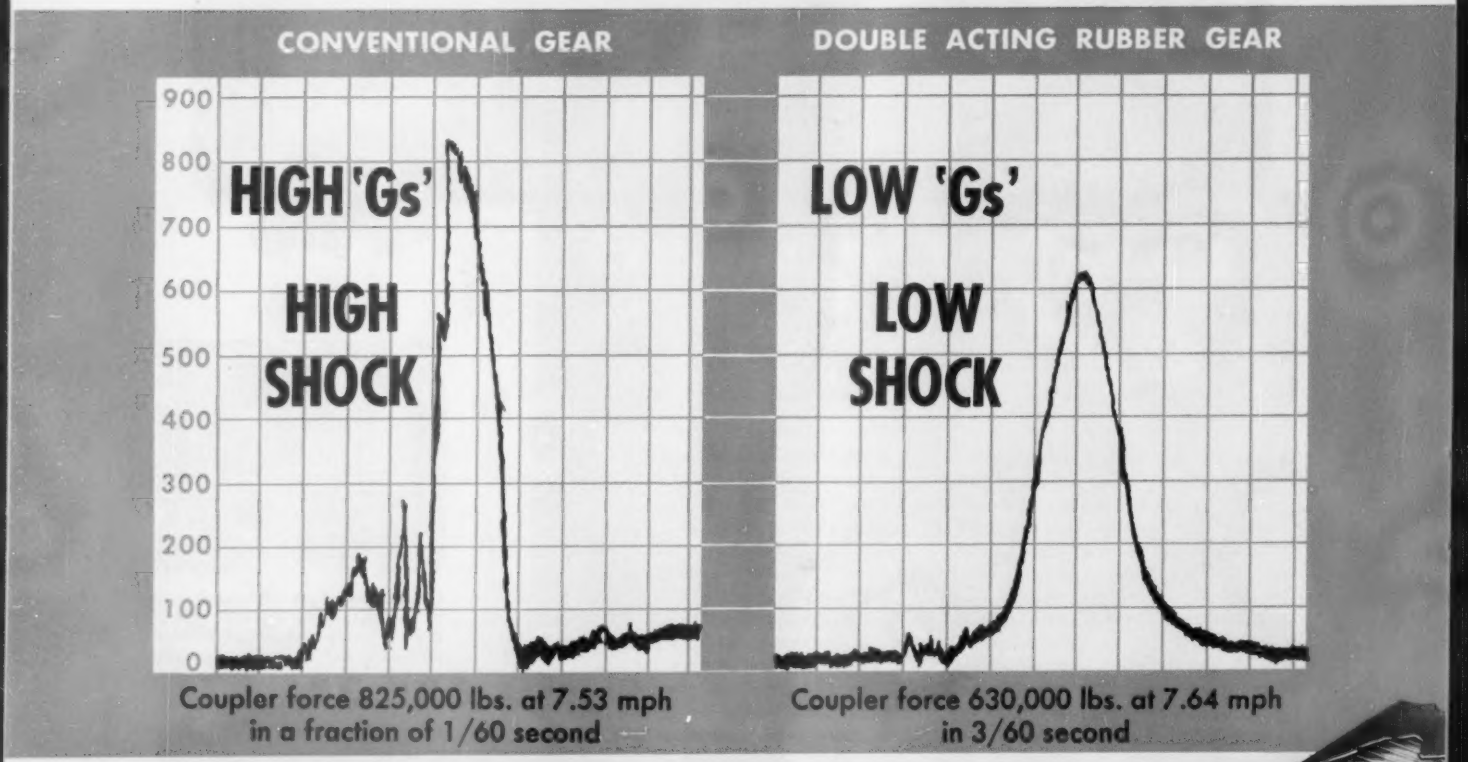
Transportation Controls

SHOCK PROOF

your piggy-back cars with the

DOUBLE ACTING RUBBER DRAFT GEAR!

Oscillographs of force rise per unit of time show why



Coupler force 825,000 lbs. at 7.53 mph in a fraction of 1/60 second

Coupler force 630,000 lbs. at 7.64 mph in 3/60 second

WAUGHMAT

DOUBLE ACTING *Twin Cushions*

The Waughmat Double Acting Twin Cushion unconditionally approved by the A.A.R.

WAUGH EQUIPMENT CO., 420 Lexington Ave., New York, N. Y.

CHICAGO • ST. LOUIS • CANADIAN WAUGH EQUIPMENT COMPANY, MONTREAL

MODERN OIL AND GAS FIRED BOILERS

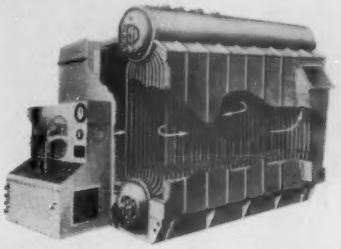
The boilers illustrated here cover the broad capacity range from 4,000 to 600,000 lb of steam per hr. They are all especially designed for gas and/or oil firing. The two units illustrated at right (Types VP and VU-55) are standardized and each is available in several sizes. The capacity range covered by these two units is from 4,000 to 120,000 lb per hr. The two units below are custom designed for various capacity, pressure and temperature requirements up to 600,000 lb per hr, 1400 psi and 950 F. All these units are pressure fired and do not require induced draft fans.

Collectively, they offer an exceptional diversity of choice. A brief consideration of the features of each type will help you "pinpoint" the design characteristics best suited to your particular needs.

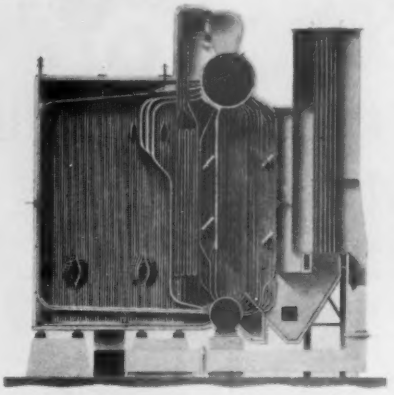
Of course there are other C-E two drum Vertical-Unit Boilers available for pressures up to 1400 psi and temperatures up to 960 F. Shown here are but four popular members of the C-E family of Vertical-Unit Boilers—a family which has achieved a wide measure of acceptance using all types of fuel.

Please feel free to call on us for further detailed information. Catalogs are available upon request.

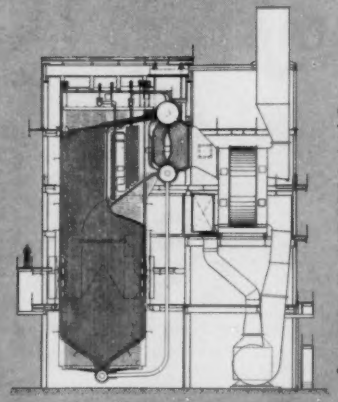
B-922-B



C-E Package Boiler — Type VP Completely shop assembled . . . available in fourteen sizes from 4,000 to 40,000 lb capacity . . . pressures to 500 psi. Available with integral console control panel, this unit contains more water-cooled area per cubic foot of furnace volume than any other boiler of its size and type. It can be equipped with any of several approved burners.

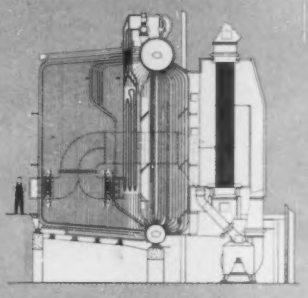


C-E Vertical Unit Boiler — Type VU-55 Available in six sizes . . . capacities from 50,000 to 120,000 lb steam per hour . . . designed for two pressure ranges, 250 psi and 500 psi, and total steam temperatures up to 750 F. This double cased, gas-tight unit is equipped with tangential burners. A large (60-inch) steam drum assures generous water capacity and steam reservoir space. Tangent tube waterwalls offer complete furnace protection, minimizing maintenance.



C-E Vertical Unit Boiler — Type V2

This unit is available for capacities from 200,000 to 600,000 lb per hr. It can be designed for pressures up to 1400 psi and for temperatures to 950 F. Tilting tangential burners, providing superheat control, are standard equipment although horizontal burners are available, if desired. A double, gas-tight casing assures lifetime tightness and minimum heat loss. Heat recovery equipment can be furnished as desired.



C-E Vertical Unit Boiler — Type VU-50B

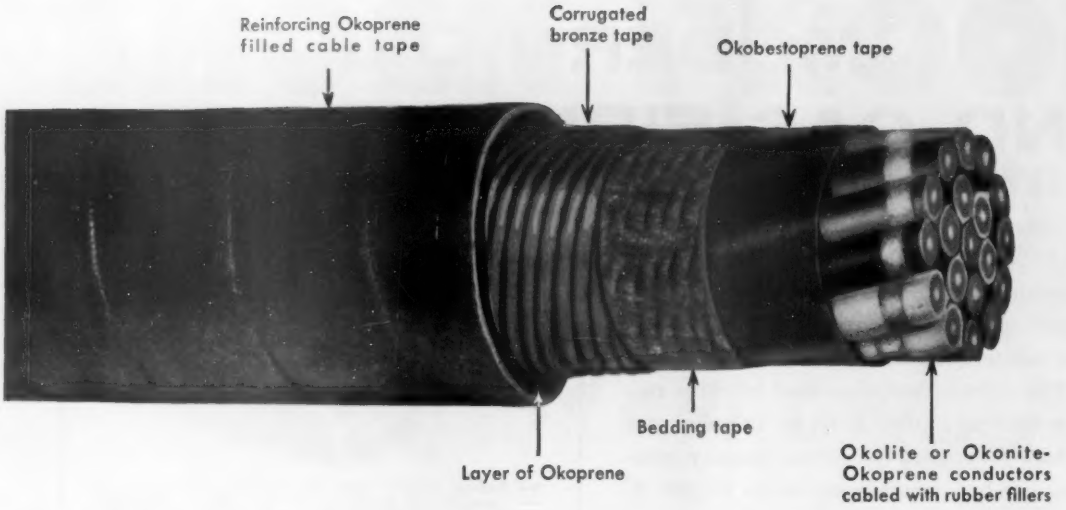
This unit is available for capacities from 50,000 to 400,000 lb per hr—pressures to 1400 psi and temperatures to 950 F. This bottom-supported design uses tilting tangential burners providing effective superheat control. Horizontal burners can be furnished if desired. Heat recovery equipment as required. This unit makes available to industrial installations a standard of performance comparable to utility practice.

COMBUSTION ENGINEERING

Combustion Engineering Building

200 Madison Avenue, New York 16, N. Y.

STEAM GENERATING UNITS · NUCLEAR REACTORS · PAPER MILL EQUIPMENT · PULVERIZERS · FLASH DRYING SYSTEMS · PRESSURE VESSELS · HOME HEATING AND COOLING UNITS · DOMESTIC WATER HEATERS · SOIL PIPE



How CM-OT strengthens and protects Okonite Railroad cables

Applications—signal and CTC control circuits • track wire • communication circuits • power circuits . . . designed primarily for direct burial use, it can also be installed in conduit, in racks, aerially, or in underground ducts.

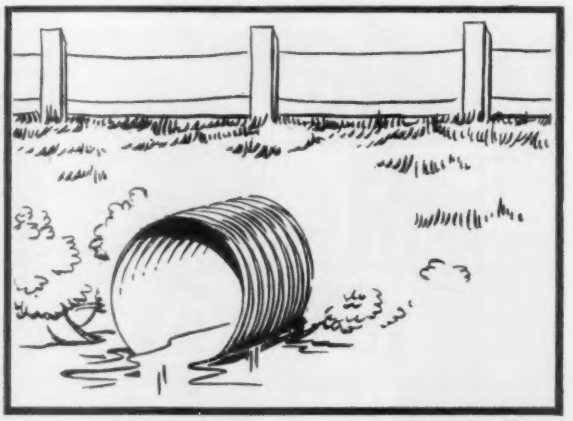
CM-OT (corrugated metal with Okoprene and reinforcing tape overall) is a protective covering designed for use on any standard Okonite-Okoprene signal cable or other Okonite railroad cable.

This lightweight covering combines the advantages of both a metallic and non-metallic sheath. The corrugated bronze tape provides high compressive strength and a permanent barrier against rodents, insects and termites. The Okoprene sheath is bonded to the corrugations of the bronze tape by vulcanization and prevents chemical or electrolytic corrosion of the tape.

Flexible, yet mechanically tough, this construction also provides excellent moisture resistance.

Electrically, the metal tape provides an easy method for locating any damage which might occur, and also acts as a shield which eliminates interference by adjacent power circuits.

Easily terminated, CM-OT cable can be trained in congested junction boxes and relay cases. Write for Bulletin RA-1086-A to The Okonite Company, Passaic, N. J.



As in underground pipes, the corrugated construction adds excellent compressive strength to insulated cable.

OKONITE SINCE 1878 **insulated cables**

4103

How Can Railroads Meet Coal Traffic Needs?

Vice-President Walter Patchell of the Pennsylvania addressed a meeting of coal operators in Cincinnati a couple of weeks ago. His subject was the mutual interests of the coal and railroad industries. The coal industry is beset by the competition of government-financed, non-taxpaying electric power — just as the railroads are beset by the competition of government-financed, non-taxpaying highways, waterways and airports.

The coal industry is still dependent upon railroad transportation for the delivery of 70 per cent of its output. Present coal production is about 500 million tons—and the coal people expect it will be 750 million tons by 1970. Where, Mr. Patchell asked, will the railroads get the additional capacity to haul 175 million more tons of coal than they are now moving?

The railroads now have an investment in excess of $2¼ billion in facilities for the movement of coal. The Pennsylvania alone has an investment of $500 million in coal-transportation facilities — which would cost it $1 billion to reproduce, at present inflationary prices.

For the railroads to haul 175 million more tons of coal than they are now moving, Mr. Patchell estimates, they will need 118,000 more hopper cars, and additional motive power to pull these cars — a total new investment of $1.2 billion, without any allowance for additions to fixed plant. Where, he asks, is all this new money coming from?

Lots of New Capital Required

The Pennsylvania handles about one-sixth of the nation's coal — so it must look forward to supplying one-sixth of the added investment, or $200 million. The railroad earned only $245 million in net income during the past decade. In other words, it will have to spend the equivalent of 80 per cent of ten years' net earnings, just to supply the additional plant it will need to handle the prospective increase in coal traffic. Mr. Patchell did not mention the fact that the railroad will also, between now and 1970, have to replace a lot of its existing equipment at inflationary prices — the difference between depreciation charges and replacement prices having to come either from net earnings or new investment from the "outside."

The speaker concluded that, basically, there can be only one dependable source of funds to equip the railroads to move this additional coal traffic — and that is the actual and prospective net earnings of the railroads from coal movement. He denied that coal is being penalized, as has been contended, by being saddled with "passenger and LCL deficits" — because, even when these deficits are excluded, coal traffic is not being charged with its "fully allocated costs." He also made clear how the railroads have striven to keep their coal rates down — realizing that they thrive only on rates "which encourage volume," and that high rates encourage consuming industries to "get on top of" their raw materials, locating factories and power plants at the pit mouths.

Mr. Patchell has done both the railroads and the coal industry a valuable service by thus bringing frankly into the open the "railroad side" of the major questions affecting relationships between the two industries. But this exposition of his, timely and thorough as it is, will need a lot of repetition — and further mutual interchange between leaders of the railroad and coal industries — before it can be expected that the coal people will fully accept Mr. Patchell's views and govern their policies to accord with the realities of the railroads' situation.

Coal People Inadequately Informed

The very fact, indeed, that Mr. Patchell should have been called upon to deliver such an address as this gives evidence of the existence of a deficiency in effective "communications" between the railroad and the coal industries. If the railroads had been effectively explaining and interpreting their situation to the coal people — in terms of the coal people's interests — during the past decade, then the basic transportation facts which confront the coal operators in marketing their product would by now be well known to them.

Just as one indication of how much some important coal people do *not* know about transportation — we have heard a coal operator express an objection to greater freedom for the railroads in making competitive rates — because he feared the railroads would then make profitless rates on competitive traffic, expecting to "make up the difference" on "captive" traffic. Such an opinion is, of course, wholly untenable because —

Any traffic the railroads recapture, at rates higher than direct costs, will make an added contribution toward meeting "overhead" costs. Hence such added traffic, even if moved at bargain rates, eases the burden on "captive" traffic, rather than increases it.

Shouldn't the establishment of a closer understanding with all important categories of shippers, and other groups with an immediate economic interest in efficient railroad service, get a high priority rating in an overall railroad industry public relations program? Such a program for closer shipper "relations," of course, would not be a one-way street — the traffic in better understanding would flow in both directions, to the benefit of all concerned.

Meaningful Figures for Management

Responsibility accounting, well established in utility field, improves cost control by directly relating expenditures to individuals who control them

A few years ago my monthly report on operations was a regular horse-blanket. Now I get a simple uncluttered statement that immediately shows me any cost that's out of line. As a control device, it's wonderful."

This testimonial, coming from the top executive in a utility company, is worthy of study by railroad officers. The speaker was commenting on a "common sense" approach to accounting which has won widespread acceptance in the utility field in the past decade. Now the system is gaining its first toehold in the railroad industry.

The new idea is called "responsibility accounting." The Minneapolis & St. Louis installed such a system in 1955; the Chicago & North Western now has a similar plan under study (Railway Age, Apr. 30, p. 41).

Simply put, responsibility accounting emphasizes cost control by reporting and summarizing organizational costs on a "who did it" basis. It pinpoints information that is useful to operating management and deemphasizes the accounting and bookkeeping aspects that can clutter up the usual financial statements.

Installation of this kind of accounting by a regulated company means, of course, a dual system of accounts. A uniform system of accounts still must be maintained for regulatory commissions. This no longer presents a severe problem, however.

The mechanization of accounting procedures makes possible the swift processing of data for both systems by merely "reshuffling the deck." Management can have the information it needs for cost control purposes, even as regulatory requirements are met.

Much work has been done in the "responsibility accounting" field in recent years by the nationally known accounting firm of Arthur Andersen & Co. John A. Higgins, a partner in the firm, was interviewed by Railway Age following a special presentation he made at the Railway Systems & Procedures meeting in April. Mr. Higgins described at that meeting the application of a responsibility system on a typical railroad (Railway Age, Apr. 30, p. 41).

Understandable Reports

In discussing the application of responsibility accounting to either a railroad or a utility company, Mr. Higgins cites at least four principal advantages to be gained.

For one thing, cost reports in a responsibility setup are simple, concise and easy to understand. Mr. Higgins has found that individuals who control company operations are not, for the most part, trained accountants, and they are inclined to lose patience when reports are filled with accounting complications. Easily understood reports, on the other hand, are more likely to be used in day-to-day operations.

Reports arrived at in a responsibility system not only are simple, but they match costs with responsibility at each level in the organization. Costs flow up the organizational lines and are accumulated and reported at the various levels of supervision. Each supervisor is charged only with the costs over which he has control.

A third advance in responsibility accounting is that it simplifies budgeting and improves budget control. This results from the segregation of costs into natural divisions of work, permitting management to fix readily the responsibilty for budget variations.

When costs are recorded by the accounts provided in the uniform system, it is impossible to determine where variations occur without a great amount of analysis.

Still another advantage of the responsibility approach, Mr. Higgins has found, is that it increases the accuracy of cost distribution in the field. Function manuals provided for the various departments clearly describe each work operation so that field forces do not have to resort to guesswork when distributing time charges.

These function manuals describe work operations in terms that field forces can understand. Under the usual system of accounts, the individual who distributes time charges must have knowledge at his fingertips as to the many different work operations which may be included in any one account.

In addition to permitting itemized cost control at each supervising level within the organization, a responsibility accounting system also provides management with monthly reports on construction work—a summary of work in progress showing amounts budgeted by job and how

COMMON PROBLEMS OF RRS AND UTILITIES

"Certainly a primary objective of all accounting should be to provide all levels of management in an organization with information that will aid them in more effectively controlling their costs and their operations.

"The accounting and reporting systems of many regulated companies fail to meet this objective.

"This failure is primarily due to the fact that most regulated companies in this country are operating under a uniform system of accounts. In most instances, such uniform systems of accounts emphasize the classification and reporting of expenditures on the basis of how they relate to physical plant, rather than on the basis of who had responsibility for the expenditure.

"These uniform classifications were developed as a means of obtaining accounting information useful for regulatory purposes with little regard for the needs of management."

much has been spent to date. These reports, based on data from the field, immediately flag any construction job where costs are getting out of line or work is lagging.

Installing a System

The installation of a responsibility system is no overnight job, but the end result, simple in appearance and simple to use, may well warrant such effort.

Each such system must be tailored to the particular operating conditions of the company it serves and the actual changeover should ideally be timed to the beginning of a calendar or fiscal year.

Mr. Higgins outlines these major steps as preliminary to adoption of a responsibility system:

1. The initial step is to clarify the lines and levels of responsibility within the organization and to clearly define the responsibilities of each department and officer. Since the organizational structure is the backbone for this type of accounting, lines of authority must be clear. Otherwise, it is impossible to match costs with responsibility.

2. The second step is the development of the function manual and instructions. The objective here is to provide a breakdown of costs in each department which will permit the department head and his supervisors to control expenditures in the most effective manner. Field activities of each department are listed and described explicitly. This standardized list is then given to field forces.

3. The third step is to modernize all accounting methods and procedures. This permits efficient handling of the increased volume of accounting reports and transactions.

4. The fourth step is the revision of reports to provide for adequate reporting of costs by levels of responsibilities.

Railroad Application

Translated into railroad terms, a responsibility system can provide supervisors at all levels and in all departments with maximum informa-

(Continued on page 56)

Railroading After Hours

by James G. Lyne

Editor, Railway Age

Interested Legislators

A couple of weeks ago I had the novel (for me) experience of appearing as a witness at the hearings being held by the House Committee on Interstate Commerce on proposed legislation to give effect to the recommendations of the "Cabinet Committee Report" on transportation policy. I was there representing the Federation for Railway Progress and, of course, my testimony was strongly favorable to the Cabinet Committee viewpoint.

The thing that deeply impresses me about these hearings is the number of committee members who are attending and their quite evident desire to inform themselves thoroughly on the transportation situation.

After I presented my direct testimony, I was questioned at considerable length by committee members; and their questions were intelligent, searching and friendly. I wound up with an assignment from the committee to prepare for them a memorandum setting forth my ideas as to what principles should govern modern-day rate-making.

I have attended other legislative hearings where the atmosphere was quite different—where few committee members were present, and where those who were on hand were inattentive. But the tone of the current inquiry is utterly and constructively different.

With the healthy curiosity of committee members as fully aroused as it quite evidently is, they're bound to welcome testimony which is helpfully informative. Hence they could not have failed to be impressed by the forthright presentations by the official railroad witnesses—the late Carter Fort and Jervis Langdon.

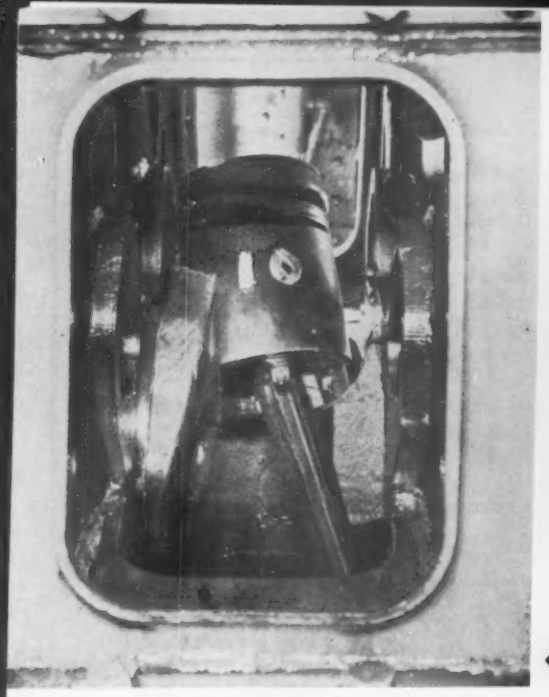
Through all the maze of detailed testimony, pro and con, the central question at issue keeps on emerging with increasing clarity: *In the competition of common carriers with unregulated carriers, are the common carriers going to be forbidden—as they often now are—to make competitive rates where their costs permit—a handicap which regulators are unable to apply reciprocally to their rivals, since two-thirds of the truckers and 90 per cent of the waterway carriers are unregulated?*

I was followed on the witness stand by John R. Staley of Quaker Oats, appearing for the NIT League. He concentrated on some of the unproductive hardships involved in carrying out the "long and short haul" clause, as presently worded.

Recalls "Pettengill Bill"

Mr. Staley mentioned briefly some of the history of the unsuccessful campaign for the "Pettengill bill" back in the thirties; and one of the committee members thanked him for the information, saying that this was the first time he'd ever heard about the Pettengill bill.

All of which gives some indication of the educational value of—and necessity for—such detailed hearings as this one now going on. An inquiry like this is the only effective method there is of getting pertinent information into the hands of legislators. It would be a good thing for the country and the transportation industry if congressional hearings like this were held every year or two—because, then, we'd soon have more congressmen who would be experts in transportation matters.



SPECTROGRAPH operated by the Pennsylvania is major link in laboratory control of diesel motive power. Specimens are "burned" at the right and resulting light is refracted and photographed at the far end.

CRANKSHAFT FAILURES have been reduced by detecting unfavorable bearing conditions with spectrographic analysis. All road and road-switcher power over 1,500 hp is under this laboratory control.

How the Spectrograph Helps Keep

Regular lubricating oil examination is now applied to every PRR road and road switcher diesel with a rating of 1,500 hp or more. This practice has done much to reduce maintenance costs and engine failures, and has increased the availability of motive power.

The Pennsylvania's EMD diesel locomotives formerly were scheduled for complete overhaul every two years. In 1953 70 EMD units were coming due for repair at approximately the same time, threatening to swamp available shop facilities. This problem was met with the road's first experience with widespread regular lubricating oil examination. Before that time only a few units had been examined on a test basis.

The 70 road freight units tested in 1953 were the first PRR locomotives to be subjected to regular spectrographic oil examination. If the engine oil showed high levels of wear metals, they were shopped immediately. If they had only modest amounts of critical metals in their crankcases, these units were operated beyond the 24-month shopping schedule then in effect. This procedure was successful in avoiding the impending shop overload. It continues in use today.

The test department makes regular laboratory (including spectrographic) examination of lubricating oil samples taken semimonthly from each road diesel crankcase. Records are maintained showing the oil's chemical and physical properties and the levels of eight elements determined spectrographically. The nominal periodic shopping routine is still maintained. However, when an engine reaches this date, it is placed on a list submitted to the test department and to the maintenance point out of which the locomotive operates.

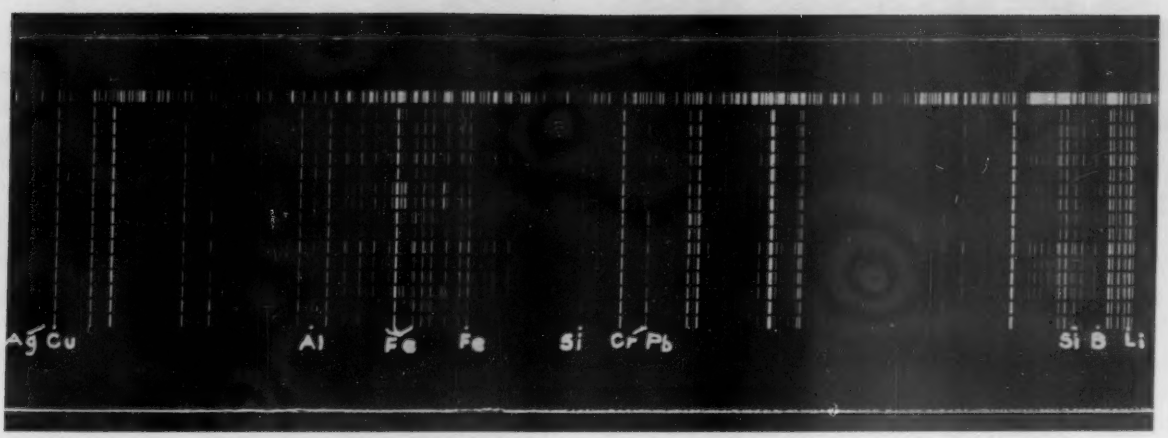
Shop Load Reduced

The maintenance point submits a report indicating whether the locomotive has a good record, or whether it is already requiring a great deal of work and has been performing poorly. The test department submits a report telling whether the engine is showing unusually high wear metal concentrations or a past history of excessive water leaks, fuel oil dilutions, or other conditions indicative of major wear. Each report indicates whether the group submitting the report feels that the unit can operate beyond its scheduled shopping time.

Monthly after the unit passes the date it is due for periodic shopping, similar reports are submitted recommending either that the unit be kept in service or be shopped immediately. These reports, together with data covering parts renewed in this unit, taken from the records of the System Parts Record Bureau, form the basis for the chief mechanical officer to determine whether the unit should be shopped or continued in service.

On a periodic shopping schedule and with the number of locomotives operated by the PRR, the heavy overhaul shops would be handling 45 units per month. Actually, with the present procedure, including spectrographic examination, the shopping load is reduced to 30 units per month. The big reduction in maintenance expenditures and increase in "on-the-road" time have been in part due to the spectrographic analysis program.

The well-equipped test department laboratory at Altoona already had a spectrograph when lubricant testing was started. It was not necessary for the PRR to acquire major equipment items to put the program into operation. In February 1954, the testing program was expanded, and 102 Baldwin freight units were among the first locomotives to be taken under control by the laboratory. During February and March 251 samples from these units were



PHOTOGRAPHIC PLATE from spectrograph is analyzed to determine the wear metals and other elements present in the engine lubricating oil. Below the standard iron spectrum at the top of the film are 15 rows of lines representing the elements in 15 oil samples from as many Pennsylvania diesel locomotives. Laboratory analyzes these plates, identifying and measuring the density of the various lines, and with this data keeps a continuing record which has played an important role in the railroad's motive power operation.

Pennsy Diesels on the Road

analyzed. Forty-six (18.3 per cent) gave values indicating improper engine conditions, classified as follows:

2 Fuel Oil Dilution
28 Bearing Defects
22 Water Leaks

It was recommended that 27 engines be given bearing examinations, and on 24 engines defective bearings were found. Renewals required 221 connecting rod and 249 main bearing halves. By continuing to point out bad engine conditions which were eliminated by maintenance forces, engine conditions were greatly improved.

In July and August 1954, there were 357 samples analyzed and improper conditions were indicated in only 25 samples (7 per cent). These conditions were classified as follows:

6 Fuel Oil Dilution
3 Bearing Defects
5 Excessive Road Dirt
6 Cooling Water Leaks

It was necessary to request only three bearing examinations. No defects were found in two of these, and only one bearing half had to be renewed in the third case.

In May 1954, an organization was set up in the test department to operate the lubricating oil examination program. Locomotives were taken up by classes, until now the laboratory is periodically analyzing samples from 1,452 diesel engines in locomotives and from 22 diesel generators under PRR diners.

The staff of 21 makes over 125 analyses daily. Major locomotive terminals make their own visual examination for water dilution and they have viscosimeters to check for fuel dilution. However, the regular samples they send to the spectrographic laboratory are checked again for water and fuel dilution and are examined for indications of oxidation, dirt, acidity, and additive effectiveness prior to being subjected to spectrographic examination.

Lubricant's Functions

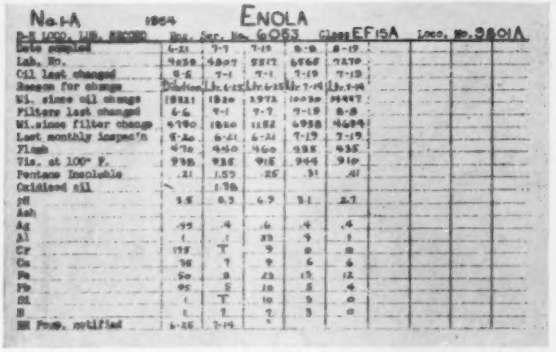
Heavy duty lubricating oil performs three functions in a diesel engine. It lubricates sliding surfaces, making possible their relative motion without heating or undue wear, and seals the spaces between pistons and liners to prevent blow-by. The oil also acts as the cooling medium for parts which cannot be water cooled. Pistons are the principal components which are oil-cooled.

Finally, oil keeps the engine clean. It should reduce lacquer and carbon deposits on pistons and in ring grooves so that piston rings will not stick. Oil ports and passages must be kept free of sludge so that the oil flow to critical parts is not reduced below the level required for satisfactory lubrication and cooling. Lubrication of sliding parts can be affected by water or fuel oil dilution reducing the lubricity of the oil. This is why checks for fuel oil and water dilution are made.

Oil oxidizes when subjected to temperatures little higher than its normal operating range. This results in the development of oxidation products which cause lacquering and produce acids that attack engine parts. Nothing about the lubricating oil will interfere with its ability to cool pistons and other parts if it is properly cooled in the oil coolers and is supplied in sufficient amounts to the parts to be cooled. If these conditions do not prevail, the oil will become overheated. The checks for oxidized oil therefore indicate whether proper oil cooling is taking place.

Finally, the heavy duty oils perform their cleaning function by containing detergent-dispersive additives.

These additives disperse products of oxidation, dirt and carbon, and hold them in suspension in the oil so that the dispersed particles will not deposit on engine parts. The effectiveness of the additive in dispersing these fine particles is gradually lost. This is one of the principal reasons for established oil change



No. 1-A 1954 ENOLA

P-R LOCO. LUB. RECORD	Rpt. Sqr. No. 6063	Class EF15A	Loco. No. 3801A
Date sampled	6-21	7-9	7-19	8-8	8-19
Lab. No.	46250	48207	52217	54665	56470
Oil last changed	5-6	7-1	7-1	7-19	7-19
Reason for change	Periodic	Periodic	Periodic	Periodic	Periodic
Mi. since oil change	19811	1920	1972	10030	20447
Filters last changed	6-6	7-1	7-7	7-19	8-8
Mi.since filter change	4780	1820	1182	4958	4484
Last monthly inspec'n	5-20	6-21	6-21	7-19	7-19
Flash	470	440	460	435	435
Vis. at 100° F.	935	935	915	904	910
Pentane Insoluble	.21	.157	.25	.31	.41
Oxidized oil		1.9%			
pH	8.5	8.3	6.9	9.1	8.7
Ash					
Ag	.05	.4	.6	.4	.4
Al	1	1	23	9	1
Cr	155	T	9	8	8
Cu	36	7	9	6	4
Fe	60	8	43	15	12
Pb	95	5	10	5	4
Si	1	T	10	9	0
B	1	2	2	3	0
RR Insp. notified	6-25	7-19			

THE PENNSYLVANIA RAILROAD
EXAMINATION OF DIESEL CRANKCASE OIL

Altoona, Pa. 6-25-54

C. A. Minster (5) Unit No. 9801A Class EF15A

Foreman, Diesel Shop, Enola Engine No. — Sampled 6-21-54

Items checked are in excess of significant values:

Condition of Oil			Spectrographic							
Dirty	Oxidized	Fuel Dilution	Lead	Copper	Iron	Chromium	Silicon	Aluminum	Boron	Others
			X	X		X				

Above conditions are indicative of high rate of wear of main and/or connecting rod bearings or thrust bearings and cooling water leaking into lube oil system.

Unless already done since sampling date, perform work items checked below:

(a) by shopping unit promptly , or (b) at next shopping of this unit X

Clean		Change	Inspect							
Engine Air Filters and Air Box	Fresh Lube Oil System	Lube Oil	Lube Oil Filters	Main and Cam. Rod Bearings	Camshaft Bearings	Thrust Bearings	Pistons and/or Liners for Wear	For Fuel Oil Dilution	For Water Leaks	For Improper By-Pass in Oil Filter System	Temp. Controls With Engine Under Full Load, for Any Excessive Lube Oil Temp.
	X	X	X	X		X			X		

Note:

Indicate below work done and defects found. Forward one copy to your GSMP or Works Manager through the regular channels and return one copy to the GSMP-D, Philadelphia, Pa., and the Engineer of Tests, Altoona, Pa.

cc: GSMP (2) J. S. Bell (1) M. A. PINNEY, Engineer of Tests 320

Works Mgr. GSMP GSMP-D Engr. of Tests

Work as follows to correct conditions reported above was done on 7-1-54. (Date)

Work done: Changed lube oil, flushed lube oil system, changed lube oil filters and engine air intake filters, water tested engine and inspected all bearings, removed all upper con-rod bearings and 1, 2, 7, 8 lower con-rod bearings, removed all main bearings, removed #4 and #11 cylinder heads and seven exhaust manifold studs.

Defects found: Bearings worn, water leaks at cylinder heads and stack studs.

IF ADDITIONAL SPACE IS REQUIRED, USE REVERSE SIDE.

C. A. Minster Foreman
Enola Diesel Shop Enginehouse

THIS RECORD CARD from typical locomotive (above) shows that spectrograph determined that the June 21 sample had high levels of wear metals and water leaks (chromate cooling water treatment was used). Physical testing of the succeeding sample showed an excessive amount of oxidized oil. In the first case the unit was found to have water leaks and needed several new bearings. The second difficulty would call for oil and filter changes, preceded by inspection of temperature controls and oil by-pass. Standard laboratory report (right) with appropriate information is forwarded to locomotive terminals; it has a section where maintenance forces indicate what trouble was actually found.

periods—to maintain additive concentration at an effective level.

The Pennsylvania has not relied on physical and spectrographic tests as a means of extending lubricating oil mileage. All PRR power operates with regular oil changes. Most freight units have the oil changed quarterly and switchers are on an annual change basis.

Spectrographic analysis determines concentrations of eight important metals in parts per million (ppm). The wear metals determined are silver, aluminum, chromium, copper, iron and lead, with determinations also being made for silicon and boron. In EMD engines the silver can come only from the wrist pin bushings. The aluminum may come from road dirt drawn into the engine with combustion air but is most likely to come from aluminum pistons in Baldwin and Alco engines. Chromium comes from chrome plated liners.

Copper and lead may come from a number of parts, such as brass bushings or camshaft bearings, but the most likely parts are the main and connecting rod crankshaft bearings.

Usually high copper in the absence of high lead indicates wear on brass or bronze bushings or thrust bearings. High lead in the absence of high copper is indicative of excessive wear on the lead overlay of crankshaft bearings where the overlay is not yet fully worn through. High copper and high lead at the same time usually mean trouble with crankshaft bearings in the copper-lead bearing metal.

Iron can come from plain iron liners, EMD pistons, piston rings, gears or crankshafts. High silicon usually shows that road dirt is getting into the engine because air filters are failing to clean incoming combustion air, and probably indicates that filters have not been changed frequently enough. Boron shows that water has leaked into the lubricating oil. Frequently the temperatures in the engine will boil off water which does get into the crankcase oil, so that physical tests will show no free water. However, boron traces tell that such leaks have occurred.

Locating Trouble Spots

The job of the head of the spectrographic laboratory is to suggest the parts of an engine which may be wearing excessively, and to recommend corrective action to prevent an engine failure. The spectrograph can tell only what elements are present and in what amounts. It cannot say that copper detected comes from main bearings, from gear bushings, or from valve rocker bushings. In a recent 3-month period, a total of 691 bearing examinations were requested, and in only 20 per cent of these was no trouble found.

About 36 per cent of the 1,683 reported water leaks during that same time were not found when first reported, although a number were located later when the spectrograph continued to indicate their presence. Reports also can call for examination for conditions causing excessive oil temperatures evidenced by oxidized oil, and for filter changes or complete oil change resulting from excessive dirt or oxidation products. The form for requesting corrective action has space for the engine terminal to report the work done and defects actually found. This is returned to the test department for information.

It has been found that generally it is no easier to predict accurately the location of trouble on one type of engine than another. Individual terminals show considerable variation in their ability to locate reported troubles. They have been a greater factor in locating trouble than the make of diesel engine involved.

The PRR has extended its locomotive mileage between major overhauls. Its spectrographic analysis program has also done much to prevent locomotive failures. Over a period of 17 months, 538 bearing inspections revealed potential or actual bearing failures. In this same time 1,038 water leaks were discovered, many of which could have further increased the number of bearing difficulties.

The spectrograph and successful diesel operation are partners on the Pennsy.

THE BETTER SUPERVISORS GET PROMOTED **4**

Does Your Business Writing . . . Transport Your Ideas?

By GEORGE N. DAFFERN

Research Assistant, Personnel Department, Canadian National

Anyone who has done railroad desk work knows that railroad business writing could be more effective. From executive officers downward, much of our writing, unfortunately, is more in the nature of grit than grease in the turning business wheels. This should not be so, for several reasons.

Effective writing is desirable in business, where writing is so much concerned with action. According to one firm of correspondence consultants, only one person in fifty has a natural talent for business writing. These consultants also assert that business people write 10-15% more letters than they need, and that most of the letters are up to 60% too long.

In railroading much depends on the written word. From executive directives, through train orders, to routine memos, much railroad activity starts with written messages. Every railroader has a vested interest in his writing. People form opinions about us from our writing. Our status and maybe our jobs depend to a large degree on it. We realize this whenever we have to write an important report. Effective writing saves time, trouble and costs. The consultants mentioned earlier moved into one firm and managed to reduce the number of outgoing letters by nearly 5%, their lengths by 25-30%. At an estimated cost of $1.00 per letter, plus the cost of filing space to house unnecessary writing, this represents many thousands of dollars saving annually.

Is it possible for a man who has little time to spare for anything but keeping the service going to improve his writing? Yes—if he does not think he already writes as effectively as necessary. Everyone can improve his writing, if he wants to make the effort. The purpose of this article is to help the reader to be a more effective writer of business language, not to help him become an author. Merely reading what follows will not improve anyone's writing. Improvement depends on follow-up efforts.

Perhaps the first thing to appreciate is that writing is affected, for better or worse, by one's attitude to it; and that we need not—in fact must not—be worried about writing. Words are tools the average railroader learned to use quite effectively at school. These tools should be used in writing as confidently as we use other tools.

The main purpose of language is to make someone understand something, or get that someone to take action. If the average man has something to convey in writing he should have little difficulty in doing so.

The snag is that too often we set out to write something we have not got; we don't have a clue to what we are going to dictate when our secretary is called in.

We can improve our writing in much the same way as we improve our clothing, for example. We improve—and become more discriminating—in our use of clothing as we become more discerning of others' clothing. So it is with words. We can improve our writing as we observe others' effective or ineffective writing; as we compare our efforts to their efforts; as we copy, avoid, add to, etc.

"Your morning mail, sir. Plenty today."

It is important to appreciate both the limitations and the possibilities of writing. The written language never will be as effective as the spoken word: the spoken word is helped by gestures and inflections. Despite this

. . . DOES YOUR BUSINESS WRITING TRANSPORT YOUR IDEAS?

handicap, the written language has tremendous power and beauty. Written language is so flexible, so alive, so full, that whatever you want to convey can be conveyed completely.

Good writing must be appropriate to the writer. We laugh when we see children dressed up as Dad and Mom or when we see Uncle dressed up as an animal. It is just as unreal when someone tries to write in a way that is completely unlike him.

It takes two to make for communication, and unless the writer remembers the reader, he is apt to write ineffectively. Great writers owe much of their success to the fact that they write with the interest of readers in mind.

And writing must be appropriate to the subject. If a subject needs a short report, make it short. If a paragraph is needed, do not write a sentence or a couple of pages. If it is an important subject give it the importance it deserves.

Technique of Effective Writing

In a recent book, "How to Write Reports," Calvin D. Linton, English professor of George Washington University, wrote: "The problems of good communication are in many ways similar to those of transportation. In each case, something is to be carried from a warehouse (the mind) by means of vehicles (words, sentences, paragraphs) to another warehouse or consumer (the reader). Ideas, which are the commodities of communication, are as varied in shape, weight, and size, and must be packaged as carefully, as the goods carried by Railway Express. It is as wasteful to put a small idea in a big word as to send an apple across the country in a two-ton truck; as hopeless to try to make a little word express a complex thought as to load a locomotive onto a pushcart."*

If the problems of writing are similar to the problems of transportation, and if we have learned to carry people and goods effectively, maybe we can use that experience to carry out ideas and feelings effectively.

The success of modern passenger trains owes a lot to comfort, color, simplicity and friendliness. What is the relationship of these characteristics to writing?

Comfort is the keynote of our cars. Seating, heating, lighting, air, vision and services are planned with the passengers' comfort in mind. We make our cars comfortable in order to make them acceptable to patrons. But do we try to make our writing comfortable for our reader? In many cases—no. Because writing is often vague, evasive, incorrect, repetitive, incomplete, or pompous, it is far from comfortable for the reader who has to try to make sense of it.

This railroad writing was uncomfortable for all who read it:

"You will have observed . . . that . . . millions of dollars have been poured into the rapacious maw of that insatiable giant among the despoilers of railway revenues which masquerades under the prosaic name of 'Freight and Express Loss and Damage Claims'. . . . This account, and the ogre it represents, might be more appropriately designated 'Despoiled Freight and Express Traffic Revenues.' The following brief table shows the baneful influence of those punitive payments upon our revenue position."

Then there was the baggage clerk who wrote to a traveler who had lost a suitcase: "We want you to deny indirect reception," a message that had to be painstakingly interpreted by the traveler to mean that he should confirm he had not received his missing case from another station. Such writing can be avoided —if the writer really considers the reader's viewpoint.

Color in Writing

What a dismal train it would be if we had not woven colors into the furnishings of passenger cars. Imagine a diner or a parlor car without colorful seats and curtains. We railroaders appreciate color, yet often our writing is formal and colorless. "With reference to yours of the 13th instant" or "please be advised" often starts a letter that has hardly a spark of life in it.

Here is an example in which someone is telling someone else that the people in charge do their best to improve the bus service: "Every feasible precaution towards the amelioration of the important branch of Passenger Transport relating to the number of the omnibuses will be adopted in the highest measure by the corporation." With that lifeless approach, no wonder both the writing and the service were not satisfactory!

Much of our phraseology is stale and commonplace. "Contents noted," "in reference to," "serious consideration," and similar phrases, tend to squeeze the life out of writing. This applies also to such trite phrases as "treat with suspicion," "swept off our feet," "grave misgivings" and "losing the battle." Such flat, formal and wornout words and phrases not only prevent freshness but add nothing to what we have to say. One educator has said there is no bigger peril to thinking than the popular phrase. Haste or laziness frequently lead us to use such expressions.

Be Yourself

What must we do to make our writing colorful? First and foremost, be ourselves. When we must write, we should write much as we speak. Steering clear of the usual, the formal phrase, we should write our message as only we ourselves could write it. Using imagination, we should try to be different and individual. Then our writing will reflect us and be alive.

Two other things that can bring color to writing are figurative language and concrete terms. Figurative language is unavoidable. Our alphabet was taken from figures—images, not numerals—and we have used words to conjure up images ever since.

So figurative is our language that many words have several meanings, with all but one meaning being figurative instead of literal. For example, think of the many uses we have for the word "head." And there are many words that often are used figuratively in the context. For example: "shouldered" (responsibilities); "reaped" (the reward); and

*"How to Write Reports," by Calvin D. Linton; published by Harper & Bros.

"showered" (congratulations). However here we refer chiefly to such accepted figures of speech as the metaphor, simile, personification, analogy, epigram, contrast, etc. Used judiciously these are excellent means of coloring language. No one can write without them, and even the dullest subject can be enlivened by them.

Here is a sample of writing from a business paper which uses figurative language profusely:

"U. S. railroad leaders are quietly stepping up a barrage of rate cuts in the running battle with their arch rivals, the trucks. Spurred by a plunge in profits and let-downs in carloadings the railmen will file a proposal, etc., etc."

"Barrage," "running battle," "spurred," "plunge"; all are figurative.

Figures of speech are colorful and helpful, but we should be careful not to mix our metaphors and analogies, or we will get the reader concentrating on our slips rather than on our message. Also we should use figures of speech which come naturally.

Those dragged in for effect usually do not have the desired result. They also draw attention to themselves rather than to the subject.

The other aid for colorful language is the use of specific terms. Everything we feel, see, touch or smell is real and specific. And so should be those things which we ask a reader to imagine. We should avoid abstract terms and generalization. We should call a spade a spade and not a gardening implement. Then the reader knows just what we mean. Here's an example of abstract writing:

"Careful consideration was given to the nature of the proposal, and the conclusion was reached that in the conditions which characterize this type of industry at present, it would be unwise to recommend it as being worthy of adoption."

The writer really meant that the proposal was considered, yet he wrote of its nature. He really meant that the proposal would not be adopted because it did not seem to suit the industry. Yet he wrote of "conditions which characterize this type of industry."

Modern passenger cars are simple. Construction, furnishings, fittings and arrangements are designed to cause the passenger least inconvenience. Elegance and splendor for our cars, but restrained elegance and simplified splendor. So it should be with our writing. In business, time is at a premium, and writing, to be effective, should take the least possible amount of the reader's effort. It is a mistake to believe that any writing calls for other than the simplest way of expression.

The effectiveness of writing depends on getting over to readers its meaning, and the simpler the explanation, the easier we get the meaning.

Yet, many of us, impressed with the importance of subject, reader, or even of ourselves, wrap our ideas and feelings in such complicated language that our meaning is obscure. Consider this specimen:

"In the premechanized pattern, the pair-based primaries and the large relatively undifferentiated collectivities composed a dynamically interrelated system that permitted an enduring social balance. The intense reciprocities of the former, with their personal and family significance, and the diffuse identifications of the latter, with their community and class connectedness, were mutually supportive. The face teams could bear the responsibility of their autonomy through the security of their dependence on the united collectivity of the pit."

Surely the psychologist who wrote this could have told us more simply that before the Longwall method of coal getting was adopted, the coal face teams and other pit workers were all one social unit and as a result, were cooperative among themselves. Abraham Lincoln is quoted as giving this piece of advice: "Use language plain enough for any boy to comprehend."

Friendly Approach

Friendliness is the last characteristic of passenger cars which may help us in our writing. We take care to see that passengers are made to feel at home. The friendly approach is instilled in our dining car staffs, our running crews and our porters. We should do likewise with our writing. A friendly helpful approach to our reader will help to make our writing more effective. This way we are almost bound to make our meaning as clear and accurate and informative as possible; to keep our writing warm, human and alive. Everyone appreciates a friendly gesture, so let us remember this in our writing.

Now let us take a look at our freight cars and get a few more guides to good writing. Remember Professor Linton's point: "It is as wasteful to put a small idea in a big word as to send an apple across the country in a truck."

Longwindedness

With wrong words and long words, jargon, longwindedness and ambiguities, our writing is too often incorrect, confusing, misleading and pompous. Let us consider just these types of words, although there are other types which can make or mar our writing.

John Stuart Mill, in a speech full of excellent advice to those who wish to become successful, ended it by saying: "Above all to insist upon having the meaning of a word clearly understood before using it."

Wrong words and unnecessarily long words often go together. Often in our endeavor to impress the reader we use long words which actually are wrong words. Schoolboys have provided humor throughout the ages as they have struggled with word meanings. "Monotony," wrote one schoolboy, "is having one wife only."

Long words, often incorrect, are also inefficient. They usually are not as direct and as vivid as the shorter words. Compare, for example, activate and prod, expedite and hurry, implement and tool, effectuate and do, the majority and most.

Long words often hide deficient thinking or knowledge. While this may protect our status or security, it does not help communication—the reason for business writing. Short words remove the curtains from the writer's thinking; they make it hard to hide or dodge things. They tend to bring out meanings clearly. Which is clearer: "In the contemplated eventuality" or "if so"? Fowler wrote: "The better the writer the shorter his

"... A friendly helpful approach to our reader will help to make our writing more effective..."

words. Those who run to long words —confuse pomposity with dignity, flaccidity with ease, and bulk with force."

Jargon and Gibberish

Nowadays jargon means, in essence, language that is unintelligible —musical or not. Gibberish (meaningless speech), some types of slang, shop talk and long-windedness are all sometimes termed jargon. Such language does not help writing. Some slang does have its uses. Some colloquialisms—a mild form of slang—would lend color and freshness to our business writing. But slang—to mean careless, "take it or leave it" language—if used frequently or injudiciously, can take away dignity from the writer or his subject and can offend the reader. It also can make a writer lazy and gets him to use "off the cuff" phrases when different words would be better.

Shop talk covers a lot of territory. There is political shop talk or jargon, scientific jargon, etc. Technical terms and terms particular to a profession or trade are indispensable, and many of them are colorful. But when a particular term prevents understanding then it hinders communication and can be termed jargon.

Jargon usually can be recognized by the number of times it breaks all rules of effective writing. It is seldom brief, direct, simple, or vigorous; it loves to use abstract words; it hates single words if a roundabout phrase can be found. It is liberal with unnecessary adjectives and adverbs. It usually says so little in so much. For example: "Investigation will usually reveal that the girl's misbehavior may be the result of interaction between temperament and environment—not overlooking, however, the fact that always at the root is some defect of character structure."

"Why didn't you say that in the report?"

Longwindedness is a long and appropriate word to describe writing taking too much time to get over its message. Verbiage and repetition cover much the same ground. An example of verbiage is a letter sent by a bank manager to a new customer:

"During an examination of our daily records we were pleased to learn that you had opened a savings account with us, and we wish to express our appreciation at being favored with your banking business.

"A booklet is enclosed showing the various services of the bank. Please do not hesitate to write or call on us should you feel that we could be of assistance to you in any way through our banking facilities."

The same message could have been sent this way:

"We are pleased you have opened a savings account with us and we appreciate your banking business. The enclosed booklet outlines our various services. Please contact us if you feel we can be of any further assistance to you."

All that has been deleted is verbiage—half the first letter.

Longwinded writing obviously is ineffective writing. This does not mean that we should write as if we are sending a telegram; courtesy and abruptness do not go well together. But it does mean that we should come quickly to the point and keep to the point.

Ambiguity

Ambiguity means a phrase with a doubtful meaning. Here is an example: "If the paints aren't liked by the family, destroy them." Obviously this sort of thing does not help; in railroad business it often calls for tracers to get clarification.

Ambiguity usually is the result of

". . . Technical terms and terms particular to a profession or trade are indispensable, and many of them are colorful . . ."

"... Clarity is the hallmark of good writing and we should take the greatest care to change any doubtful phrases before our writings leave our hands..."

muddled thinking, hasty assembly of words, wrong word order, ignorance of word meanings, or defective punctuation. Clarity is the hallmark of good writing and we should take the greatest care to change any doubtful phrases before our writings leave our hands.

Signals and Punctuation

This is the next analogy we can draw between railroading and writing. A train needs signals to get it from one place to another; and to stop or start. Signals in writing are, in the main, punctuation marks. Punctuation has to serve for the gestures, inflections and other subtleties in spoken language. To get over our meaning in writing we have to signal to the reader when to pause, halt, sidetrack, when things are doubtful, etc.

One of the chief requisites of effective railroad signaling is for the signaler to know the meaning of each signal and always to use the correct one. So it should be for the writer. Unless he understands punctuation and uses the marks properly, his writing is at worst meaningless and at best confusing. Here is a meaningless piece of writing: "It was and I said not but." And here is a confusing piece of writing: "I am going to New York perhaps with Murphy."

The fault with both of these examples is punctuation. Properly punctuated they become intelligible: "It was 'and,'" I said, "not 'but.'" "I am going to New York, perhaps with Murphy."

Proper punctuation is more important than spelling. Incorrect punctuation can give misleading ideas, spelling seldom does.

Shakespeare wrote his name at least four different ways, yet he took the greatest care with punctuation. Why? Because he knew that while friends knew him just as well as Shakespeare or Shakspear, his writings would be that much less effective for each mistake in punctuation.

Happily, most—but not all—punctuation comes easily to any adult. We have to watch our dashes, commas and colons, our periods, parentheses and apostrophes, quotes and question marks (to mention the most important) if we are to punctuate properly. As to how to punctuate, the following three points should be of assistance:

1. The better we understand what we want to convey, the easier it is to punctuate.

2. The simpler we write the easier it is to punctuate.

3. We should make sure we know the uses of each punctuation mark. There are many useful books on the subject.

Yards and Units

The final analogy we are going to use concerns yards. We make up trains in yards by concentrating on the individual cars and then marshaling them together. We switch this car to that track, to that train, etc. By carefully planned arrangements, we bring harmony out of the seeming confusion of yards. This is similar to what we must do with jumbled thoughts to express them on paper. We should start by knowing just what we have to say and where we have to say it; we should decide the best way to send it; we should send it as quickly and carefully as we can. To elaborate:

1. Know what we have to send and where we have to send it. This means to know exactly why we are writing. This rule should prevent any unnecessary writing and prevent us from omitting anyone (second copy, etc.) who should get the information.

2. Decide the best way to send it. A writer can arrange his words properly before expressing them. This usually means making an outline, mental or written, to save time and trouble for both writer and recipient. For a report, a written outline, is advisable. To state properly the object of a report, courses of action open, the recommended plan and the reasons, the illustrations, etc., a logical framework needs to be prepared so that ideas and thoughts can be built into it.

3. Send it as quickly and carefully as we can. One simple way of writing letters as quickly as possible is to remove from many of them most of the first paragraphs. With modern filing systems and reference marks we waste time acknowledging and reiterating. Our writing should come quickly to the point, and close cordially but positively.

To send our letters, reports, etc., as carefully as possible means checking to insure they are technically accurate. When the reader detects spelling mistakes, typographical errors, etc., it detracts from the effect.

In discussing effective writing, we have covered a lot of ground. To write effectively we need to appreciate one thing further. Robert Louis Stevenson made the point when he wrote: "When I say writing, it is re-writing that I have chiefly in mind."

Conclusion

To be effective writers, we have to be painstaking in our efforts. We have to cut here, rewrite there, and redraft until it is satisfactory. Of course, time costs money in business and we should not work for perfection, but when it comes to choosing between spending either the reader's time elucidating, or the writer's time improving, then the writer should do the spending.

Perhaps the best way to revise is first of all to let the work "get cold" before you take another look at it; then go through it looking for verbiage; errors in spelling, punctuation and grammar; errors in choice of words, sentence structure or paragraphing. It may not be possible to cover all these points with one reading and two or more readings may be necessary. Lastly, reading one's writing aloud quite often brings to light things that need changing.

And now to business and practice. We need to practice and go on practicing if we are to acquire the art of effective writing.

How To Make Class "A" Box Cars

Class "A" box cars are in short supply. The situation is expected to get worse during the next several months and to meet it railroads are resorting to plenty of emergency upgrading. Such upgrading is being done not only to handle grain and other bulk commodities, but to take care of the increasing number of packaged products which require good cars. In these pages Railway Age describes some of the tools and materials available to the carriers for these purposes.

Emergency upgrading meets an immediate problem. More extensive repairs would keep too many cars out of service too long during the heavy loading months. Yet a number of the railroads' suppliers, along with some of the railroads, are asking why the carriers go through this emergency cycle so frequently. Is there not some way, they ask, to keep a car in Class A condition for most of its life, and yet allow it to be used for rough freight, too?

Several manufacturers have answered these questions in the affirmative, but have said: "Get rid of wood in car interiors, at least in the lower several feet of the side and end walls." The Southern has done just that with 1,200 new 50-ft box cars (Railway Age, May 30, 1955, p. 33). The Atlantic Coast Line presently is building some cars with steel side and end walls. Both roads have covered the walls with a tough neoprene liner.

Upgrading materials, aside from those classed as permanent, might fall into categories of temporary and semipermanent upgrading. In the latter category would fall patching materials which would last for several trips of the car, as well as wooden grain doors, etc. In the temporary or "one shot" category would fall lining papers, paper grain doors, etc. —items which generally survive only one car trip. Materials in each of these groups are roughly so classified in the following pages.

PERMANENT UPGRADING

Why "upgrade" cars frequently? Why not fix them so that they're good cars for long periods of time?

That's the philosophy behind the proposal that "GACO" neoprene sheets be applied to the walls of cars. (Railway Age, May 30, 1955, p. 33.) The Southern, in trying out the idea, had built for it by Pullman-Standard 1,200 box cars with walls of steel covered with GACO neoprene sheet.

The neoprene sheet resists abrasion, and since the steel walls to which it is bonded repel thrusts which damage ordinary car walls, so far as walls are concerned, the car tends to remain Class A for extended periods. The liner of neoprene makes cleaning the car walls easy.

GACO is applied to a smooth surface, which would be free of scale, dirt or grease. After a primer has been placed on the car walls the neoprene sheets are applied. This process is said to take very little labor time. The cost of labor and material for placing the neoprene liner on the walls of a 50-ft box car, to a height of 4 ft, is said to be a little over $100. Less than 5% of this cost is for labor. *Gates Engineering Company, 100 S. West st., Wilmington 99, Del.* •

CAR INSECTICIDE

Box cars can become infested from grain and flour in transit. This can cause both carriers and patrons trouble when subsequent loads of these commodities are loaded in infested cars. West Disinfecting Company, in its insecticide which contains pyrethrins and piperonyl butoxide, believes it has the answer to control of these insects.

Before the insecticide is sprayed into the car (at least 1 gal per car should be used, West states) the car should be well swept. Then the side and end walls as well as the floors are sprayed thoroughly, with all corners getting a good dose. After the car has been sprayed the floor should be lined with Kraft paper which should overlap side and end walls. West insecticide is sprayed using either an electric powered "Mistorizer" or Westone sprayer. The insecticide, it is said, has no objectionable odors and will not corrode metals. *West Disinfecting Company, Dept. RA, 42-16 West st., Long Island City 1, N.Y.* •

HUMMEL DUNNAGE DOOR

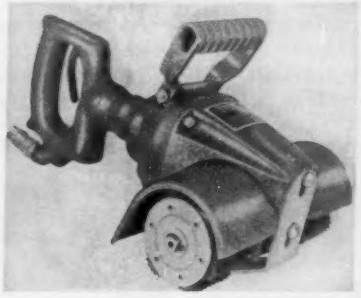
The Hummel dunnage door weighs only 35 lb. It is a paper door with a strong reinforcing wood frame. The frame is 7 ft wide while the paper is 9 ft wide. The frame, its maker states, fits snugly into the car door and prevents leakage around the sides of the car door and at the bottom. The same manufacturer makes what it calls a "one man" car liner, which it says one man can install in a few minutes. These liners are made in standard sizes to fit general types of cars. Coverings for walls and floors are one piece for each purpose. These liners can be made of any weight Kraft paper the purchaser desires. *Hummel Manufacturing Company, Dept. RA, Hopewell, Va.* •

FOUR UPGRADING TOOLS

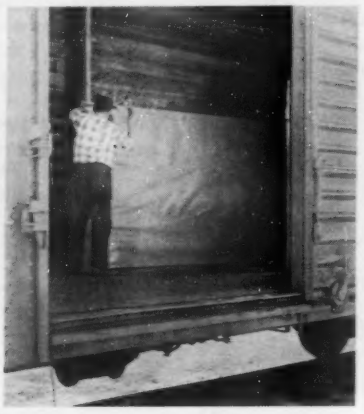
Upgrading of box cars is more than a mere patching of holes in floors and walls. Shippers need and demand clean cars. Sometimes this means not only sweeping out cars, but chipping or scraping material from car walls. Accompanying photos show some of the equipment used for these purposes.

One man sweeps an entire box car in 3¼ minutes. It is estimated that an experienced operator could sweep a typical car in approximately 2½ minutes. Manual sweeping time per car averages 9.3 minutes for two men with pushbrooms (18 or 19 man-minutes) according to car shop personnel of one railroad. *G. H. Tennant Company, Dept. RA, 2570 N. 2nd st., Minneapolis 11, Minn.* •

Cleaning and smoothing stock car floors in 50% of the usual time is the performance claimed for the 6-hp gasoline powered scraper. Here the operator is removing a ½-in. accumulation of frozen manure, sand and ice from the floor. The machine (Model CR) cleans an 8-in. path and works to within about 1 in. of car walls. *G. H. Tennant Company, Dept. RA, 2570 N. 2nd st., Minneapolis 11, Minn.* •



This portable chipping tool was designed for removing tough deposits from surfaces in hard-to-reach areas in cars, bins, etc. powered by a ¾ hp (12,000 rpm) electric or air motor, this tool reportedly works from 12-20 times faster than a man with a hand scraper. Chipping action is provided by twin cutter-equipped cylindrical heads rotating at high speed. The machine is used for removing rust from steel, cleaning paint from surfaces, etc. *G. H. Tennant Company, Dept. RA, 2570 N. 2nd st., Minneapolis 11, Minn.* •



Intended for paper-lining freight cars is the Bostitch H2BR stapling hammer. The staple it uses is made of galvanized wire, .103 in. wide, while staple legs are ⅜-in. long. Width of the staples is said to provide extra surface contact which keeps paper from tearing away from the walls of the car. Magazine of the H2BR holds 50 staples. *Bostitch, Dept. RA, Westerly, R.I.* •

Plastinail floor after seven years of service.

PLASTINAIL FOR CAR FLOORS

Plastinail, a magnesium oxychloride cement composition, is hard, tough, shock resistant and is said to be as nailable as wood. Some 30 roads now are said to be trying it out as a means for cutting car floor maintenance costs. The floor produced when Plastinail is applied is non-abrasive, it insulates the load and keeps it dry, clean and free from vermin.

In applying Plastinail to structurally sound car floors, the rough floor first is covered with felt paper. Reinforcing mesh then is nailed to the floor to provide a bond for the cement. Then ¾ to 1 in. of the Plastinail is trowelled over the floor area. The developers of the material say that it probably will double the strength of the floor and may provide double the service expected from wood floors. *Westvaco Mineral Products Division, Dept. RA, Food Machinery & Chemical Corp., 161 E. 42nd St., New York 17* •

PERMANENT PLASTIC CAR LINER

A newcomer to the field of tough permanent plastic car liners is Leader-Kote 700. This product may be brushed or sprayed on walls or floors. It is not affected by solvents and most acids. It is non-toxic in its cured state, its manufacturer states, which makes it acceptable for cars which carry grain, sugar or flour. *Coatings Division, Leader Iron Works, Inc., Dept. RA, 410 N. Michigan ave., Chicago.* •

(Continued on page 48)

UNION PACIFIC RAILROAD COMPANY

Fifty-Ninth Annual Report—Year Ended December 31, 1955

REPORT OF THE BOARD OF DIRECTORS

New York, N. Y., April 26, 1956.

To Stockholders of Union Pacific Railroad Company:

The Board of Directors submits the following report for the Union Pacific Railroad Company, including its Leased Lines*, for the year ended December 31, 1955.

CONDENSED STATEMENT OF INCOME

	1955	1954
Operating revenues	$509,362,476	$481,786,451
Operating expenses	$370,526,330	$365,858,880
Taxes (including taxes on income from oil and gas operations and other non-transportation sources)	72,517,848	63,686,778
Equipment and joint facility rents—net charge	22,578,806	22,679,243
Net income from transportation operations	$ 43,739,492	$ 29,561,550
Net income from oil and gas operations (excluding income taxes)	28,075,475	33,743,135
All other income	13,207,325	12,133,390
Total income	$ 85,022,292	$ 75,438,075
Fixed and other charges	5,795,036	5,815,410
Net income from all sources	$ 79,227,256	$ 69,622,665

Net income from all sources, before dividends on preferred and common stocks of Union Pacific Railroad Company, represented a return for the year of 7.90 per cent on the average equity (par value of capital stock plus surplus) of Union Pacific Stockholders, compared with a return of 7.23 per cent in 1954.

Net earnings per share of common stock, after preferred dividends, amounted to $16.93, or $2.17 more per share than in 1954. However, if wage increases granted to employes during 1955 had been in effect for the entire year, operating expenses would have been increased by approximately $16 million, which after allowing for a consequent decrease in Federal income taxes, would have reduced net earnings per share of common stock in 1955 by about $1.73.

It should also be noted, as explained under "Taxes," that about $2.68 of the net income per share arose from the deferment of Federal income taxes resulting from the rapid write-off, for income tax purposes, of the cost of certain improvements.

OPERATING REVENUES

The increase in **Freight revenue** was largely a reflection of the nation-wide improvement in business activity and general prosperity in 1955. Ton-miles of revenue freight were 8.7 per cent greater than in 1954 and represented the largest volume of freight traffic hauled by the Union Pacific in any year since the World War II year of 1945. There was a drop of 1.6 per cent in average revenue per ton-mile, which can be ascribed partly to an increase of .7 per cent in average distance hauled per ton and partly to fluctuations in relative quantities of the many different commodities carried. The general level of freight rates in 1955 was unchanged from 1954; however, the temporary increase in rates effective May 2, 1952, which was to have expired December 31, 1955, was made permanent by the Interstate Commerce Commission.

The largest *increases* in revenue were in: *automobiles and parts*, as the result of the record-breaking output and sales by manufacturers in 1955; *iron and steel products, bituminous coal*, and *iron ore*, chiefly because of ex-

* Leased Lines are: Oregon Short Line Railroad Company, Oregon-Washington Railroad & Navigation Company, Los Angeles & Salt Lake Railroad Company, and The St. Joseph and Grand Island Railway Company. Figures in the Income Account are stated on a consolidated basis, excluding offsetting accounts between companies.

(*Advertisement*)

panded operations of steel plants; *lumber* (during first nine months of the year) and *plywood*, reflecting increased construction activity; *canned and packaged food products*, resulting from greater eastbound movement from Pacific Coast points in response to increased consumer demand; *less than carload freight*, due to improved business conditions, a strike of truckers in Pacific Coast and other Western areas for a short period in the late spring, and recapture of some traffic from highway carriers; *machinery and parts*, with more shipments of machines both for industrial purposes and for household use; *soda products*, resulting principally from continued expansion of production at Westvaco, Wyoming; and *forwarder traffic* (consolidated shipments tendered by freight forwarders for movement in carload service), as the result of the increase in business volume and the strike of truckers mentioned above.

The most substantial *decreases* in revenue were in: *ammunition and explosives*, attributable to reduced Government traffic; *wheat*, due to decline in shipments to Pacific Northwest ports for export and a greater proportion of the current year's crop having been stored locally under Government loans; *sugar*, resulting primarily from smaller sugar beet crops; *hay*, because of less movement to supply farms in Missouri, Arkansas, and Texas, which suffered from drought in 1954; and *corn*, chiefly because of smaller crops and reduced requirements in Pacific Coast areas for livestock and poultry feed.

The decrease in **Passenger revenue** was occasioned by less rail travel generally, fewer movements of military personnel, and continuation of the trend toward greater use of coach service at low fares. However, passenger revenue per train mile increased 22 per cent because of a reduction of 21.6 per cent in unprofitable passenger-train miles.

The decrease in **Mail revenue** resulted from inclusion in 1954 of credit representing retroactive 10 per cent increase in compensation for handling and transporting mail for the last quarter of 1953, and reduction in volume of mail handled because of diversion to other forms of transportation.

The increase in **Express revenue** was due to a general increase in movement of rail express traffic.

The increase in **Other revenue** was principally in switching and demurrage, because of the expanded volume of freight traffic.

OPERATING EXPENSES

The decrease in the "operating ratio" from 75.94 in 1954 to 72.74 in 1955 (the lowest since 1950) resulted from an increase of 5.7 per cent in operating revenues, with an increase in operating expenses of only 1.3 per cent, notwithstanding the considerably greater volume of freight traffic moved in 1955, and increases in expenses caused by higher wage rates and other employe benefits.

Success in thus holding down operating expenses may be attributed chiefly to the increased proportion of trains hauled by diesel and gas-turbine locomotives as the result of acquisitions in 1954 and 1955, with consequent savings in cost of locomotive fuel, enginehouse expenses, etc.; sharp reductions in mileage of unprofitable passenger trains and in number of dining cars and Pullman sleeping cars operated over the Company's lines; reduced charges for personal injuries and for freight loss and damage; more sales of scrap material (credited to operating expenses); less new rails laid in renewals; and economies achieved through various additions and betterments to road property and rolling stock.

The principal increases in expenses, other than those primarily attributable to increased freight traffic or higher wages, were in cost of ties laid in renewals, expense of removal of snow and ice from tracks, charges representing value of non-depreciable road property retired, and depreciation charges.

Quantities of rails, ties, and ballast used in main track renewals were as follows:

	1955	Increase (+) or Decrease (—) vs. 1954
New rails (track miles)	237.73	— 11.87
Second-hand rails (track miles)	94.95	+ 11.93
Total rails (track miles)	332.68	+ .06
Ties (number)	832,568	+243,242
Ballast (cubic yards)	454,823	+184,173

The most important of the increases in wage rates referred to above were 10½ cents per hour starting October 1, 1955, granted to operating employes (such as conductors, engineers, brakemen, firemen, and switchmen) and 14½ cents per hour starting December 1, 1955, granted to nonoperating employes (such as shop, maintenance, clerical, and telegraph employes). Since these increases were granted late in the year, their effect on operating expenses will naturally be much more pronounced in 1956, as indicated by the fact that if they had been in effect for the entire year, operating expenses in 1955 would have been greater by approximately $16 million. In addition to the wage increase granted to nonoperating employes, they were also granted, effective February 1, 1955, a monthly allowance representing one half of the cost of a plan to cover medical and hospitalization expenses (effective March 1, 1956, such allowance will be increased to cover the entire cost of the plan).

TAXES

State and county taxes were greater primarily because of sharp increases in rates of ad valorem taxes.

The increase in **Federal income taxes** resulted principally from increased taxable income in 1955, but was also due partly to the accruals in 1954 having been reduced by a credit adjustment for over-accruals in 1953. In determining income taxes in recent years, taxable income has been reduced by substantial amounts representing excess of (a) deductions for amortization, on a 5-year basis, of portions of the cost of equipment and other improvements certified by the Office of Defense Mobilization to be necessary in the interest of national defense, over (b) annual charges against income, under Interstate Commerce Commission regulations, for depreciation based on the estimated total lives of such improvements. The approximate amounts involved for 1955 compared with 1954 were as follows:

	1955	Increase over 1954
Amortization deductions	$28,659,788	$6,427,143
Excess of amortization over depreciation	22,934,114	5,183,470
Reduction in income taxes	11,925,739	2,695,404
Betterment in net income per share of common stock	$2.68	$.60

(*Advertisement*)

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Net income from all sources	$ 79,227,256	$ 69,622,665

Net income from all sources, before dividends on preferred and common stocks of Union Pacific Railroad Company, represented a return for the year of 7.90 per cent on the average equity (par value of capital stock plus surplus) of Union Pacific Stockholders, compared with a return of 7.23 per cent in 1954.

Net earnings per share of common stock, after preferred dividends, amounted to $16.93, or $2.17 more per share than in 1954. However, if wage increases granted to employes during 1955 had been in effect for the entire year, operating expenses would have been increased by approximately $16 million, which after allowing for a consequent decrease in Federal income taxes, would have reduced net earnings per share of common stock in 1955 by about $1.73.

It should also be noted, as explained under "Taxes," that about $2.68 of the net income per share arose from the deferment of Federal income taxes resulting from the rapid write-off, for income tax purposes, of the cost of certain improvements.

OPERATING REVENUES

The increase in **Freight revenue** was largely a reflection of the nation-wide improvement in business activity and general prosperity in 1955. Ton-miles of revenue freight were 8.7 per cent greater than in 1954 and represented the largest volume of freight traffic hauled by the Union Pacific in any year since the World War II year of 1945. There was a drop of 1.6 per cent in average revenue per ton-mile, which can be ascribed partly to an increase of .7 per cent in average distance hauled per ton and partly to fluctuations in relative quantities of the many different commodities carried. The general level of freight rates in 1955 was unchanged from 1954; however, the temporary increase in rates effective May 2, 1952, which was to have expired December 31, 1955, was made permanent by the Interstate Commerce Commission.

The largest *increases* in revenue were in: *automobiles and parts*, as the result of the record-breaking output and sales by manufacturers in 1955; *iron and steel products*, *bituminous coal*, and *iron ore*, chiefly because of ex-

* Leased Lines are: Oregon Short Line Railroad Company, Oregon-Washington Railroad & Navigation Company, Los Angeles & Salt Lake Railroad Company, and The St. Joseph and Grand Island Railway Company. Figures in the Income Account are stated on a consolidated basis, excluding offsetting accounts between companies.

(*Advertisement*)

panded operations of steel plants; *lumber* (during first nine months of the year) and *plywood*, reflecting increased construction activity; *canned and packaged food products*, resulting from greater eastbound movement from Pacific Coast points in response to increased consumer demand; *less than carload freight*, due to improved business conditions, a strike of truckers in Pacific Coast and other Western areas for a short period in the late spring, and recapture of some traffic from highway carriers; *machinery and parts*, with more shipments of machines both for industrial purposes and for household use; *soda products*, resulting principally from continued expansion of production at Westvaco, Wyoming; and *forwarder traffic* (consolidated shipments tendered by freight forwarders for movement in carload service), as the result of the increase in business volume and the strike of truckers mentioned above.

The most substantial *decreases* in revenue were in: *ammunition and explosives*, attributable to reduced Government traffic; *wheat*, due to decline in shipments to Pacific Northwest ports for export and a greater proportion of the current year's crop having been stored locally under Government loans; *sugar*, resulting primarily from smaller sugar beet crops; *hay*, because of less movement to supply farms in Missouri, Arkansas, and Texas, which suffered from drought in 1954; and *corn*, chiefly because of smaller crops and reduced requirements in Pacific Coast areas for livestock and poultry feed.

The decrease in **Passenger revenue** was occasioned by less rail travel generally, fewer movements of military personnel, and continuation of the trend toward greater use of coach service at low fares. However, passenger revenue per train mile increased 22 per cent because of a reduction of 21.6 per cent in unprofitable passenger-train miles.

The decrease in **Mail revenue** resulted from inclusion in 1954 of credit representing retroactive 10 per cent increase in compensation for handling and transporting mail for the last quarter of 1953, and reduction in volume of mail handled because of diversion to other forms of transportation.

The increase in **Express revenue** was due to a general increase in movement of rail express traffic.

The increase in **Other revenue** was principally in switching and demurrage, because of the expanded volume of freight traffic.

OPERATING EXPENSES

The decrease in the "operating ratio" from 75.94 in 1954 to 72.74 in 1955 (the lowest since 1950) resulted from an increase of 5.7 per cent in operating revenues, with an increase in operating expenses of only 1.3 per cent, notwithstanding the considerably greater volume of freight traffic moved in 1955, and increases in expenses caused by higher wage rates and other employe benefits.

Success in thus holding down operating expenses may be attributed chiefly to the increased proportion of trains hauled by diesel and gas-turbine locomotives as the result of acquisitions in 1954 and 1955, with consequent savings in cost of locomotive fuel, enginehouse expenses, etc.; sharp reductions in mileage of unprofitable passenger trains and in number of dining cars and Pullman sleeping cars operated over the Company's lines; reduced charges for personal injuries and for freight loss and damage; more sales of scrap material (credited to operating expenses); less new rails laid in renewals; and economies achieved through various additions and betterments to road property and rolling stock.

The principal increases in expenses, other than those primarily attributable to increased freight traffic or higher wages, were in cost of ties laid in renewals, expense of removal of snow and ice from tracks, charges representing value of non-depreciable road property retired, and depreciation charges.

Quantities of rails, ties, and ballast used in main track renewals were as follows:

	1955	Increase (+) or Decrease (—) vs. 1954
New rails (track miles)	237.73	— 11.87
Second-hand rails (track miles)	94.95	+ 11.93
Total rails (track miles)	332.68	+ .06
Ties (number)	832,568	+243,242
Ballast (cubic yards)	454,823	+184,173

The most important of the increases in wage rates referred to above were 10½ cents per hour starting October 1, 1955, granted to operating employes (such as conductors, engineers, brakemen, firemen, and switchmen) and 14½ cents per hour starting December 1, 1955, granted to nonoperating employes (such as shop, maintenance, clerical, and telegraph employes). Since these increases were granted late in the year, their effect on operating expenses will naturally be much more pronounced in 1956, as indicated by the fact that if they had been in effect for the entire year, operating expenses in 1955 would have been greater by approximately $16 million. In addition to the wage increase granted to nonoperating employes, they were also granted, effective February 1, 1955, a monthly allowance representing one half of the cost of a plan to cover medical and hospitalization expenses (effective March 1, 1956, such allowance will be increased to cover the entire cost of the plan).

TAXES

State and county taxes were greater primarily because of sharp increases in rates of ad valorem taxes.

The increase in **Federal income taxes** resulted principally from increased taxable income in 1955, but was also due partly to the accruals in 1954 having been reduced by a credit adjustment for over-accruals in 1953. In determining income taxes in recent years, taxable income has been reduced by substantial amounts representing excess of (a) deductions for amortization, on a 5-year basis, of portions of the cost of equipment and other improvements certified by the Office of Defense Mobilization to be necessary in the interest of national defense, over (b) annual charges against income, under Interstate Commerce Commission regulations, for depreciation based on the estimated total lives of such improvements. The approximate amounts involved for 1955 compared with 1954 were as follows:

	1955	Increase over 1954
Amortization deductions	$28,659,788	$6,427,143
Excess of amortization over depreciation	22,934,114	5,183,470
Reduction in income taxes	11,925,739	2,695,404
Betterment in net income per share of common stock	$2.68	$.60

(*Advertisement*)

The reduction in income taxes resulting from this situation is more in the nature of a tax deferment than a true tax saving, because in future years, after the cost of the improvements has been amortized, income taxes will be greater than if the accelerated amortization had not been allowable.

The increases in **Federal unemployment insurance taxes** and **Federal retirement taxes** were due to larger payrolls and to an increase from $300 to $350 per month in the maximum amount of compensation per employe subject to the taxes beginning July 1, 1954.

Total taxes for 1955 were equivalent to 14.2 per cent of total operating revenues and to $1,457.82 per employe. Total taxes were also equivalent to $16.31 per share of common stock, or only 62 cents less than the Common Stockholders' equity ($16.93 per share) in net earnings.

OIL AND GAS OPERATIONS

	1955	1954	Increase	Decrease	Per Cent
Receipts from sale of oil, gas, and other products	$44,929,079	$48,069,619	.....	$3,140,540	6.5
Production expenses (including depreciation) ...	$8,326,066	$6,760,469	$1,565,597	.....	23.2
Taxes (other than income taxes)*	3,281,629	3,186,885	94,744	.....	3.0
Intangible drilling and development costs†	5,245,909	4,379,130	866,779	.....	19.8
Total charges against receipts	$16,853,604	$14,326,484	$2,527,120	.....	17.6
Net income from oil and gas operations	$28,075,475	$33,743,135	.....	$5,667,660	16.8
Drilling and development costs not charged against receipts	$2,218,111	$2,603,736	.....	$385,625	14.8

* Federal taxes on income from oil and gas operations, of approximately $8,372,100 in 1955 and $10,719,000 in 1954, are included in "Taxes" under "Transportation Operations."

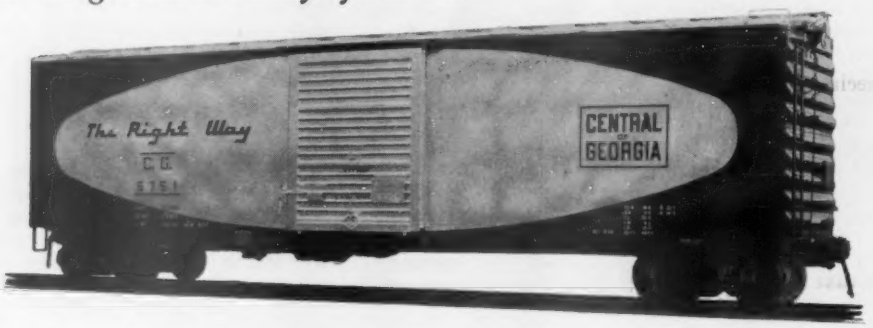
† Represents costs such as labor, fuel, repairs and hauling in connection with drilling, geological work, clearing ground, building roads, and certain materials with no salvage value.

The decrease in receipts was due primarily to reduced oil production in the Wilmington field, partially offset by increased production in the Rangely field and other areas. The increase in production expenses was caused chiefly by higher wages and material prices, more extensive re-drilling and well stimulation measures, and increased expense for maintenance of dikes protecting the Wilmington field. Greater drilling activity in various areas, coupled with higher wage and material costs, caused the increase in intangible expenditures.

(*Advertisement*)

CENTRAL of GEORGIA

A Progressive Railway of the South



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RIVERSIDE MILLS COTTON JOURNAL BOX PACKING

in their new aluminum oval box cars.
It meets or exceeds all AAR specifications

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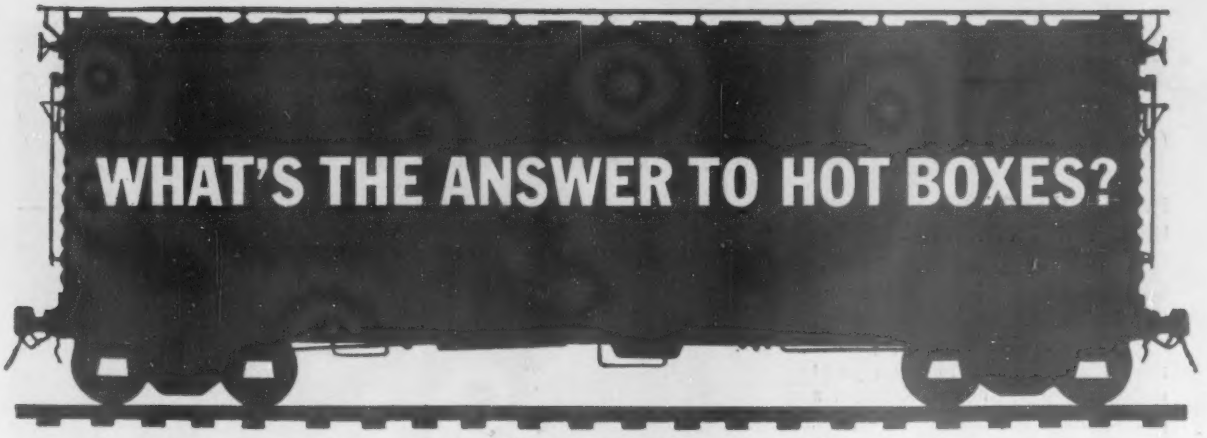
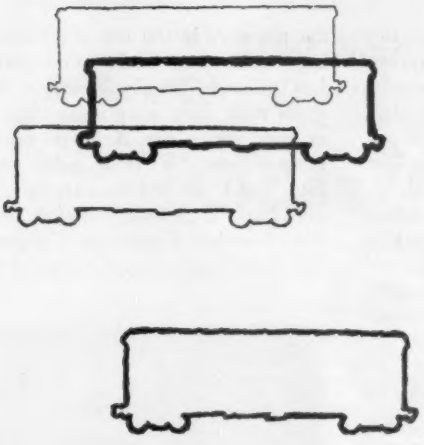


Wise maintenance, not gimmicks!



"Stop hot boxes"... "No more hot box troubles"... so it goes, all the headlines promising the magic cure. But is it really that simple? Are lubricating "gadgets" the real answer to the hot box problem?

First, and perhaps most important of all, these devices still have to be proved in service, since most of them have been approved on the basis of short-time tests. Only time will tell if they can withstand the severe shocks of actual operation. Secondly, these mechanical or other contrivances are expensive. Finally, they present problems for maintenance men because they all have a little bit different construction and handling procedures.

A study of the maintenance records for a group of typical railroads using thread packing shows an average of nearly 900,000 miles per hot-box car. However, some lines roll up almost four times the mileage of others... without higher maintenance expenditures. The answer seems to lie in the "good housekeeping" of these roads... spending the same number of maintenance dollars, but more wisely.

We can help you with this problem. Our members specialize in the production of thread packing... the best available. We've worked hand-in-hand with the AAR to develop top-quality packing. Our Seal on bales of new packing guarantees quality which meets or exceeds AAR requirements. It has been proved that the economies and service life of thread packing, used in 90% of the nation's rolling stock, are still tops.

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JOURNAL BOX PACKING
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Miller Waste Mills, Inc., Winona, Minn.
National Waste Company, New York, N. Y.
O'Neill Brothers, Inc., Philadelphia, Pa.
The Pittsburgh Waste Co., Inc., Swissvale, Pa.
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Royal Manufacturing Company, Perth Amboy, N. J.
Southland Manufacturing Co., Inc., Norfolk, Va.
Twin City Textile Mills Waste Co., St. Paul, Minn.

CLASS "A" BOX CARS...

(continued from page 43)

HARD SURFACE UPGRADING MATERIAL

A hard surfacing material for freight car lining is being tried by the Union Pacific (Railway Age, April 30, p. 45). This Espey Carliner can be applied to any type of wood as well as to steel, although a primer may be needed for steel. Brushes are used to apply the resin to the car walls or floors.

In applying the liner to car walls, first a glass cloth is stapled into place on the walls. Then the resin is brushed on over the cloth. Cost for applying to the complete car, the UP has found, is about $200 for material and $100 for labor.

Espey can be used as a patching material for covering holes in car walls and floors. Its resistance to abrasion is expected to make the lives of car floors and walls considerably longer than they are at present. *Spring Packing Corporation, Dept. RA, 332 S. Michigan ave., Chicago 4* •

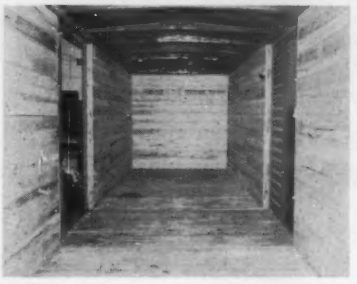
ADM FREIGHT-LINER

For either patching of bad spots in car lining or floors or complete relining of the car, Archer-Daniels-Midland offers the railroads a "package" consisting of a fiber glass cloth and a plastic material. The plastic and fiber glass for doing the whole relining job are of types different from those used in the patching work. Both, however, are known as the "ADM Freight-Liner," and both are applied in the same manner.

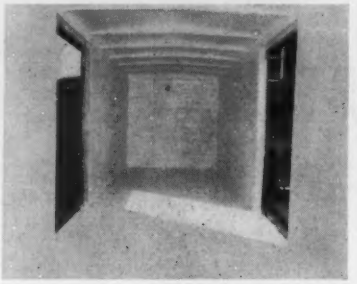
Application of the Freight-Liner is simple. First the area to be upgraded is sprayed with the plastic. Then the fiber glass cloth is placed over the still damp plastic. Then another coat of plastic is sprayed over the glass cloth. Cars are ready for use in 3-6 hr after the upgrading work is done, Archer-Daniels-Midland states.

One layer of the material is said to provide strength to withstand pressure. If it is desirable, the material can be laminated, layer on layer.

The Freight-Liner is said to remain firm at temperatures up to 240 deg F, and does not get brittle at temperatures down to —30 deg F. It can be cleaned with detergents, disinfectants or steam without injuring it. *Archer-Daniels-Midland Co., Dept. RA, 700 Investors Building, Minneapolis 2, Minn.* •



BEFORE — car ready for Railroad Cocoon.



AFTER — car completely cocooned ready for hauling China clay.

RAILROAD "COCOON"

"Cocooning," which combines the use of Fiberglass cloth and a sprayable vinyl, is being used extensively by a number of railroads in the "quickie" upgrading of several types of cars, particularly box cars. The materials, manufactured by the R. M. Hollingshead Company of Camden, N. J., are suitable either for patching holes in car lining or for covering one or more walls completely. Material and labor costs for "Cocooning" are said to be about 25¢ per sq ft of surface covered.

Railroad "Cocoon" will adhere to any dry surface which is free from scale, grease or loose dirt. The material provides a smooth water-tight seal, which also is flame resistant. It also is highly resistant to abrasion and will not contaminate commodities with which it comes in contact.

The material is easily applied. Once the area to be covered is clean, a thin coating of the "Cocoon" is sprayed on. This then is covered with the Fiberglass cloth, and the cloth is covered to the desired thickness with the sprayed-on "Cocoon." One railroad has stated that patching jobs which used to cost $75 or more in material and labor costs now can be done for an average of about $20. The railroad doesn't see this as replacing normal upgrading, but it is a rapid durable way of making spot repairs. (This system was described in Railway Age, July 12, 1954, p. 56.)

Officers of the Rock Island, one of the pioneers in the use of "Cocooning," state that during this period just prior to the beginning of the grain rush, they were Cocooning 60 or more cars a day. And says one of these officers, "We'd be doing more than that if we had the cars to work on." *Paper & Plastics Division, Dept. RA, Brandon Equipment Company, 332 S. Michigan ave., Chicago 4* •

BEFORE — damaged corner of box car.

AFTER — Railroad Cocoon used as a patching material in corner.

(continued on page 52)

Use this simple three-step method: Car No. 31480 was first sprayed with Freight Liner plastic material. Glass cloth was then readily applied. Job was finished with final plastic coat.

Great Northern car No. 31294, relined January 12, 1955 at St. Cloud. General view shows excellent condition after 9 months continuous service. Railroad still rates car Class "A".

After Nine Months of Rough Service, Box Cars Upgraded With ADM Freight Liner Rate . . .

Class "A" with GREAT NORTHERN RAILWAY

Upgraded on January 12, 1955, with ADM Freight Liner, these two Great Northern boxcars, Nos. 31480 and 31294, have seen hard and continuous service ever since they were relined.

A service check of the cars, made September 15, 1955, when these photos were taken, showed that both cars were in outstanding Class "A" condition.

For complete relining or for patching, the ADM Freight Liner System is simple, low cost and practical. It can be applied in any location.

The ADM Freight Liner System not only upgrades cars faster but reduces damage claims and per diem charges. Claims for sacks and packaged goods torn in transit are drastically reduced. Leakage of bulk shipments is controlled.

Qualified ADM service engineers provide everything needed to start your yard crew on an upgrading program. For an ADM Freight Liner System demonstration on your own tracks, write, wire or phone (FEderal 3-2112—Minneapolis) ADM FREIGHT LINER SYSTEM, 702 Investors Building, Minneapolis 2, Minnesota.

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Other ADM Products: Linseed, Soybean and Marine Oils, Paint Vehicles, Synthetic and Natural Resins, Polyesters, Fatty Acids and Alcohols, Hydrogenated Glycerides, Spurm Oil, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa, Livestock and Poultry Feeds.

ARCHER-DANIELS-MIDLAND COMPANY
702 Investors Building
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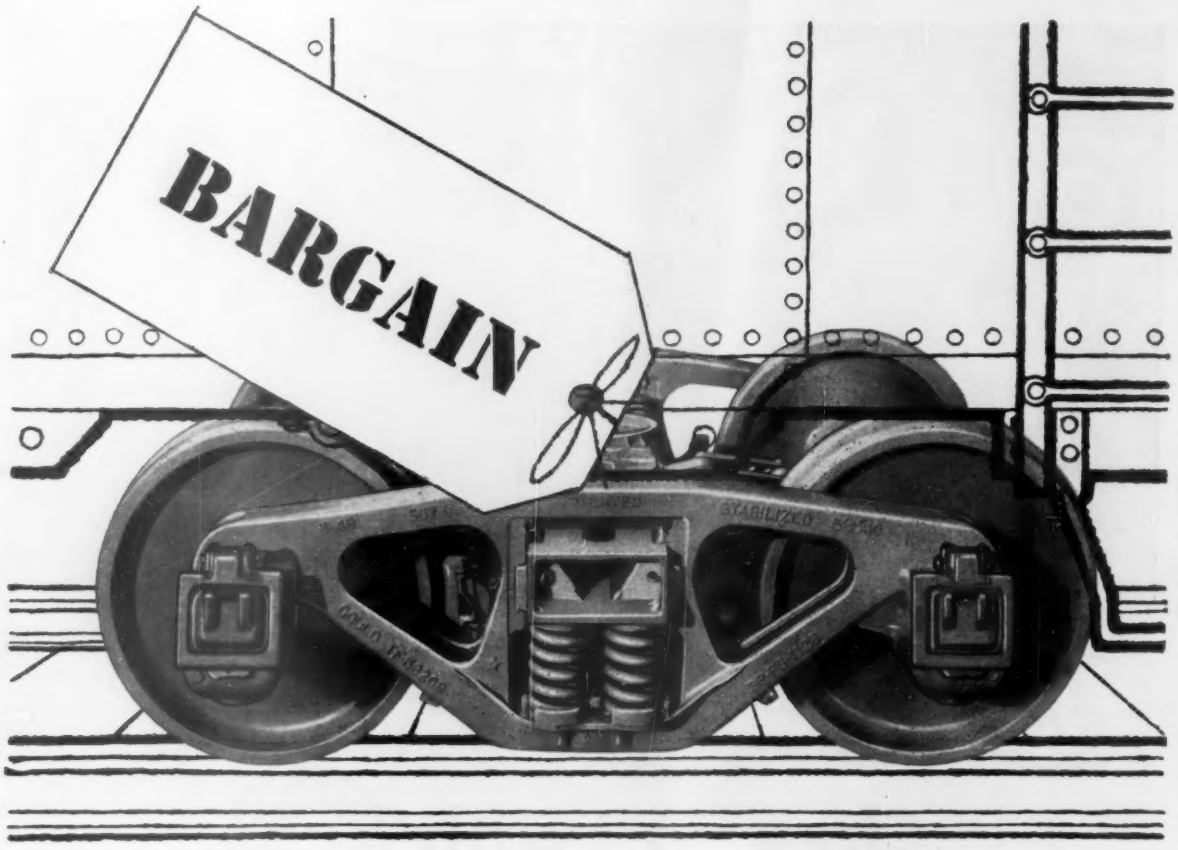
☐ Yes, I would like to arrange an ADM Freight Liner demonstration.
☐ Please send literature on the ADM Freight Liner System.

Name _____
Position _____
Address _____
City _____ Zone ____ State _____



COSTS SO LITTLE . . .
GIVES SO MUCH PROTECTION

Today Barber Stabilized Trucks are a greater bargain than ever because their savings are greater! Higher speeds mean more chances for costly damage to ladings and equipment.

Barber Stabilized Trucks provide a safe, dependable system of suspension and protection. Actuating springs, friction shoes and wear plates work together as vertical dampers and truck resquaring devices. Bumps and bounces are cushioned and compensated, nosing and violent swivelling prevented. Thousands of damage claims are *completely eliminated;* your equipment is protected; rail pounding and track maintenance are reduced.

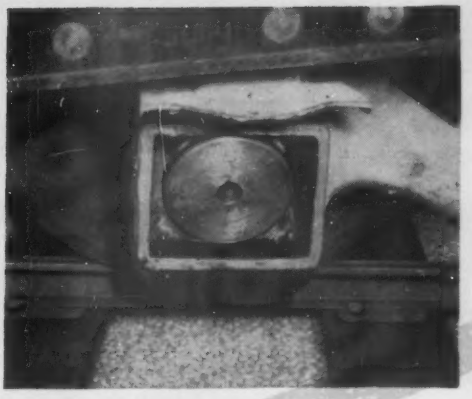
We firmly believe that *nothing* you specify does so *much* for your railroad yet costs *so little* as Barber Stabilized Trucks! Standard Car Truck Co., 332 S. Michigan Avenue, Chicago 4, Ill. *In Canada:* Consolidated Equipment Company, Ltd., Dominion Square Building, Montreal 2.

Specify Smoother-Riding

BARBER
STABILIZED TRUCKS

simple The "Redipak" lubricating pad is a square block of foam neoprene, molded with cored passages and covered with cotton wicking material. It is installed—without any other packing—in the standard journal box without jacking the box.

foolproof The square "Redipak" lubricating pad is fully symmetrial—it can be installed any side out, either face up. It can be inserted by hand or with a "Redipaker"—a simple bent rod which speeds up the work—and is removed with a standard packing hook.



Stop Hot Boxes!

"Redipak" Lubricating Pad points the way towards elimination of the hot box problem

cool-running The "Redipak" lubricated bearing has operated as much as 50°F. cooler than waste-lubricated bearings, under certain conditions. In laboratory starvation tests, with no free oil in the box, the "Redipak" retained enough oil for 10,000 miles of high speed operation.

long-lasting In service tests, "Redipak" lubricating pads have operated over 90,000 miles each, without noticeable wear. No pad has shown any sign of glazing. Inspection of the bearings shows that the pads do not lint.

No waste . . . with "Redipak"!

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION

ST. LOUIS 10, MISSOURI

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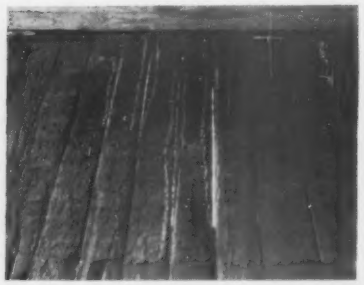
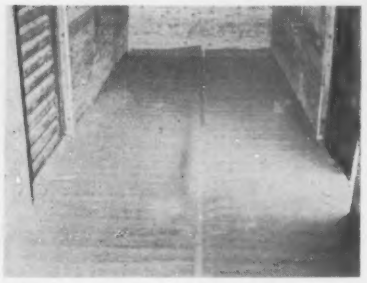
CLASS "A" BOX CARS..

(continued from page 48)



BEFORE—Not a very good car for loading grain or any commodity requiring a high class car, but especially bulk materials or bagged products.



AFTER—$6.36 worth of Lipp liner and special tape, plus less than ½ man hour of time, and the car is Class A.

EMERGENCY UPGRADING LINER

The Lipp Emergency Upgrading Liner is a waterproofed reinforced wrapping paper. It consists of two sheets of 40-lb Kraft paper laminated with an asphalt compound, and creped after lamination. Creping provides for 18% stretchability of the material. The reinforcement is rayon yarn. The liner is furnished in rolls 62 in. wide and containing 164 lin ft of paper. The liner may be taped or tacked to wood surfaces. *J. J. Lipp Paper Company, Dept. RA, 323 W. Polk st., Chicago 7* •

PERMANENT CAR LINING

The need for a freight car lining material that would be both tough and resilient resulted in the development of the Rheeflex Neoprene sheet liner for railroad cars. The toughness is for resistance to abrasion and abuse; the resilience is for resistance to vibration and shocks. Other characteristics of such a car liner are: resistance to splinters, vermin and water.

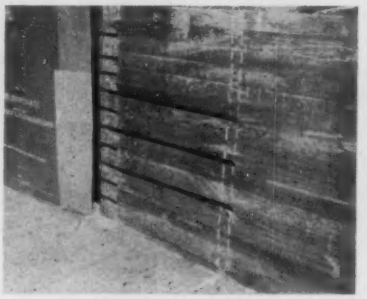
The Atlantic Coast Line presently is building in its own shops 75 cars equipped with the Rheeflex railroad car liner system. The Rheeflex is being applied to steel car walls. Rheeflex neoprene sheeting is produced in sheets up to 60 in. wide. Application is relatively simple. First the surface to be coated should be sandblasted. Then a special primer is applied to the surface receiving the coating. Following this a cementing compound is applied to the wall and to the neoprene sheeting material. After a drying period the neoprene sheet is applied to the walls. In applying sheeting to the walls care must be taken to see that air pockets are not created under the sheeting material.

Cost of the material for a box car is said to vary between $100-200, depending on many factors, such as the height to which the walls will be covered, length of car, etc. Labor costs involved in the application are said to be a small fraction of material costs. *Rhee Elastic Thread Corporation Dept. RA, Suite 236B, 4000 Cathedral ave. NW, Washington 16, D. C.* •

ACME Steel grain doors are shipped in two distinct parts ready for installation: the steel beams; the assembled grain door roll which includes lumber, nails and lath.

STEEL REINFORCED PAPER GRAIN DOOR

The new Acme grain door consists of heavy reinforced paper supported horizontally by two steel beams and vertically by four steel slat braces. A 2-in. by 2-in. pryboard and a 1-in. by 6-in. climb-out board are attached to the reinforced paper with heavy duty metal stitches, as are the vertical slat braces. The steel beams are re-usable. One man, the manufacturer states, can cooper the two doors of a car with the Acme door in ten minutes. Only five nails are driven into each door post. Pryboard, climb-out board and beams all have predrilled nail holes to help speed installation. *Acme Steel Company, Dept. RA, 2840 Archer ave., Chicago 8* •



CORRUGATED BOARD GRAIN DOOR

Paper grain doors can be applied even to box cars with faulty door posts. The Ford two-panel door has steel strap extensions so that faulty door posts may be by-passed and the door nailed to the first studs on each side of the door. This makes it possible to use for bulk loading many cars which normally would not be considered for such service.

The Ford door is furnished in complete sets which can be handled by one man. The set includes nails for securing the doors, lath for securing side flaps of the door to car walls, and a kit of steel strap extension bands. The doors themselves are of corrugated board with steel strap reinforcing an integral part of the door. *Ford Grain Door Company, Dept. RA, 110 N. 40th st., Omaha 3, Neb.* •

CARTITE UPGRADING PAPERS

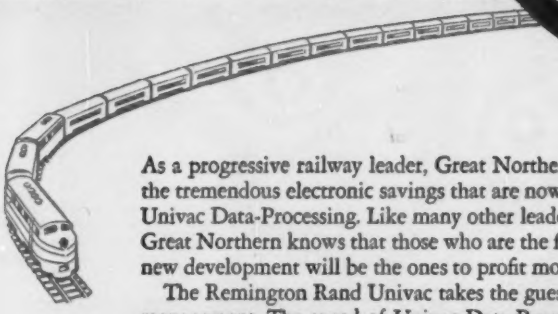
Nine types of car lining papers, known as Cartite, are on the market. Most of the papers consist of two sheets of 30-lb. kraft paper combined in a double coating processed by asphalt compounds. However, single sheets creped and waxed are avail-

(Continued on page 56)

UNIVAC®...

Great Era for Great Northern

GREAT NORTHERN RAILWAY



As a progressive railway leader, Great Northern has quickly recognized the tremendous electronic savings that are now available through Univac Data-Processing. Like many other leaders of American industry, the Great Northern knows that those who are the first to install this revolutionary new development will be the ones to profit most from its use.

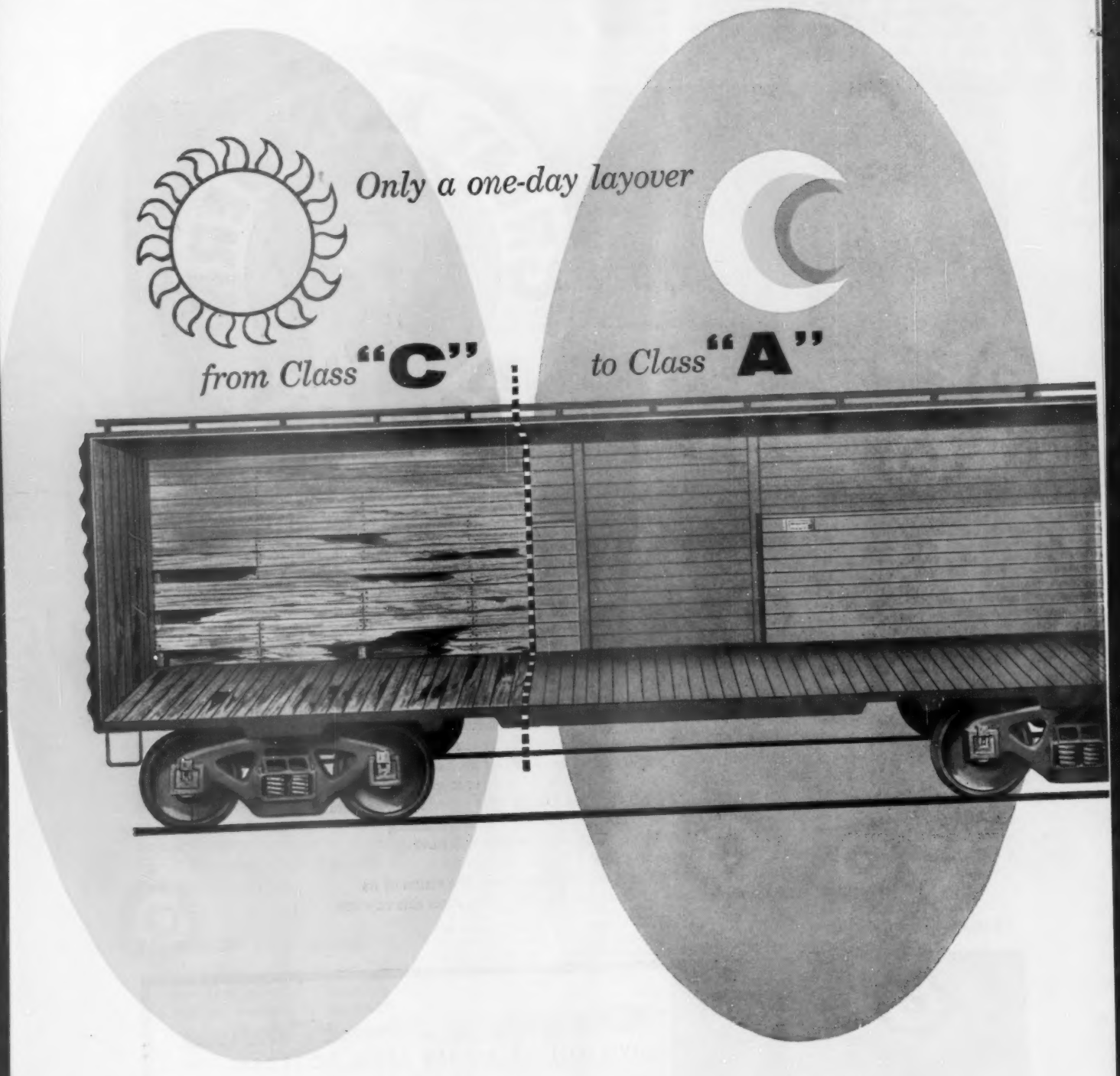
The Remington Rand Univac takes the guesswork out of railroad management. The speed of Univac Data-Processing enables today's executives to review every relevant fact when making a decision. It makes available to him complete, accurate facts on his company's operation... spotting trends, and making reliable predictions. Univac provides management with a degree of precision never before attainable.

Not only does Univac give management a clearer picture of railroad operations—it also processes automatically, at electronic speed, the myriad records and reports required. Univac thus introduces a new era in railroad administration... an era of freedom from today's crushing paperwork burden... an era in which management will have the facts it needs *when* it needs them.

The Great Northern has demonstrated, once again, the vision of its enlightened management, by being among the first to enter this new era.

Remington Rand Univac
DIVISION OF SPERRY RAND CORPORATION

Fast, inexpensive relief



from the Car Shortage

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Carliner

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better
than new

At a cost so low it should easily come within present operating budgets, you can transform old cars into top-revenue carriers with *permanent* new Espey Carliner.

It goes on over splintered, but sound wood floors and lining—over cracks, gouges, oil spots—forms an *inseparable* lamination much stronger than wood. Seams, joints, and corners are sealed . . . warping and separation prevented.

Your shippers get what they want and need—good-looking, moisture-free, vermin-proof cars, completely safe for edible lading.

Ease of application, effectiveness in use, and increased car-earnings have all been demonstrated on *many* major roads. Espey Carliner surface-armor will serve you as nothing else can. Write for facts, today.

SPRING PACKING CORPORATION

For over 36 years

332 S. Michigan Avenue, Chicago 4, Illinois

CLASS "A" BOX CARS...

(Continued from page 52)

able. This waxed material is used to line cars for such shipments as flour and rice, where asphaltically bonded papers would be objectionable.

The asphalt laminated papers are tough, and they are water repellent to prevent lading from being damaged by water. Most of the asphaltic papers are reinforced with spun fibers to provide increased tensile strength and tear resistance. Several of the papers are 18% creped for increased puncture resistance, cushioning, flexibility and ease of application.

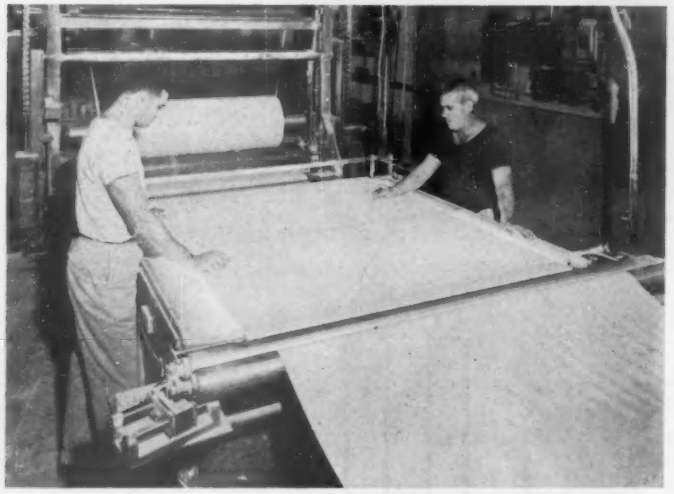
Cartite papers come in standard size rolls 60 in. wide by 164 ft long. Special sizes are available. *Brandon Equipment Company, Dept. RA, 332 S. Michigan ave., Chicago 4* •

PERMANENT UPGRADER

A plastic coating that will last "indefinitely" is being used by 16 railroads and private car lines as a permanent upgrading material. The Armortex coating is a tough mastic which bonds to box car floors and walls. When dry, Armortex forms a smooth surface which is easily cleaned by normal methods. The manufacturer states that one of its main advantages is that it will eliminate "costly preparation of cars for individual loadings."

Armortex can be applied to car walls and floors and can be either sprayed or brushed on to surfaces. Such surfaces must be clean, the larger cracks caulked, and broken boards replaced, before Armortex is applied. One man, the manufacturer says, can apply it to the walls and floor of a standard box car in about three hours. The next day the car may be usd for loading. Armortex is called resistant to vermin, abrasion, solvents and oils. It will not absorb water. It is odorless and will not stain or discolor lading. *J. W. Mortell Company, Dept. RA, 504 Burch st., Kankakee, Ill.* •

RHEEFLEX WORKS FOR THE RAILROADS



Perfection in Process. One of several inspection points which along with laboratory control of materials and processing assures uniformity of gauge and quality necessary to efficient freight car liners.

Rheeflex Liner System—Class "A"

A liner material system consisting of Rhee Neoprene sheet and compatible components which combine to achieve maximum toughness and strength with the necessary resilience (unattainable with hard surface materials) for service in railroad freight cars ("Containers in Motion").

Among the Principal Features: Permanence — long operating life . . . vermin resistance . . . splinter resistance . . . water resistance . . . abrasion resistance . . . shock resistance . . . increased revenue —decreased maintenance costs. FOR NEW CARS—FOR OLD CARS "Upgrading to Class "A"—box cars, refrigerator cars, hoppers, covered hoppers. Installed on steel or wood. It's economical and "keeps them rolling." *Write, phone or wire*—Railroad Materials Dept.

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Cherry 5-6600

Railway Dept.
Suite 236B, 4000 Cathedral, N.W.,
Washington (16), D.C.
Emerson 2-5164

MEANINGFUL FIGURES . .

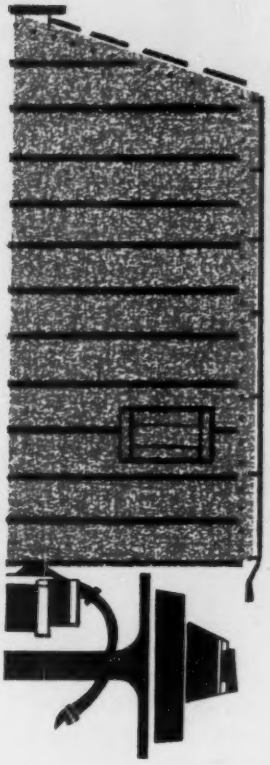
(Continued from page 33)

tion from a minimum of accounting reports.

A division superintendent, for example, can be provided with a detailed monthly statement, showing all costs he budgeted and is responsible for. At the next higher level the general superintendent's report carries fewer details but includes other operating divisions for which he is responsible. Finally, the operating vice-president receives information not only about train operations but about other activities assigned to his department.

At each step in the build-up, the cost-control information is provided at the very level where it can be best used. Items over which the individual officer has no control—rents, taxes, depreciation, and the like—are shown only in statements to top management.

The president's report, concise and simple, provides a clear picture of the railroad's operation department by department.



Guarding the roll in roller freight

National Oil Seals are vital to the smooth, trouble-free operation railroads expect from freight car roller bearing journals. Developed by National, these precision seals mount inside the journal box, keeping lubricant in, dirt, water and brine out. Uniform sealing is maintained under all conditions.

National Oil Seals are rolling hundreds of thousands of miles without replacement, and are playing an increasingly important part in the railroads' program of better equipment and service. When railroads completely standardize roller bearing journal sizes, still more roller freight will come into operation, and service to shippers will be even faster and more dependable.

National supplies oil seals for roller freight journal boxes, generators, compressors, vehicles and other equipment railroads use—and has provided over 1,000,000,000 additional oil seals for America's cars, trucks, tractors, aircraft, machinery and household appliances.

NATIONAL MOTOR BEARING CO., INC.
Plants: Van Wert, Ohio, Redwood City, Downey and Long Beach, California
General Offices: Redwood City, California

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Excellent Condition—Immediate Delivery!

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SERVICE-TESTED® FREIGHT CAR REPAIR PARTS
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6,000 - 8,000 and 10,000-gallon
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POSITION WANTED

Railway Mechanical Engineer. Twenty years experience cars and locomotives. Western location desired. Can be available about July 1st. Address Box 515, RAILWAY AGE, 79 West Monroe St., Chicago 3, Illinois.

3000 APPRENTICES IN TRAINING

They are employed by the railroads which use our texts and grading service to train *all* their apprentices. Staffed by railroad men since 1909, The Railway Educational Bureau offers a complete 3- or 4-year program of technical lessons—from blueprint reading through Diesel Maintenance. All texts written with simplicity plus technical accuracy for on-the-job learning. Description of plan followed and fields covered sent without obligation.

Special programs are available for individual employees preparing for advancement. THE RAILWAY EDUCATIONAL BUREAU, 1809 Capitol Avenue, Omaha 2, Nebraska.

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20 years experience in operations, maintenance, safety, personnel relations, public and government relations, industrial relations, and industrial development. Qualifications and references from nation's top railroad and government executives on request. Address Box 2128, RAILWAY AGE, 79 West Monroe Street, Chicago 3, Illinois.

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to RAILROADS • ALL STEEL CABOOSE CARS
3 TYPES • ROAD • BAY WINDOW • YARD

Built to the most exacting specifications for maximum performance in fast operating service.

RAIL & INDUSTRIAL EQUIPMENT CO., INC.
30 Church Street, New York 7, N. Y.
RR Yard & Shops, Landisville, Pa.

This is the fifth in a series of advertisements about the people of Standard.

Railroader—From Maine to Florida

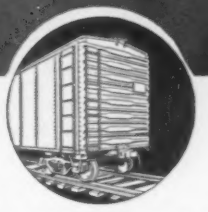
You should know H. L. (Hod) Kent.

Hod lives in the country near Morristown, N. J.

There he does week-end farming and indulges in his hobbies, horses and golf.

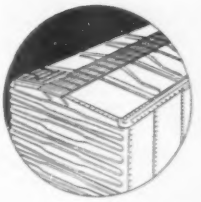
During the week you'll find him hard at it for Standard. Hod's job is directing and handling the sales and service of Standard's products in the East. His title is Assistant Vice President and Eastern Sales Manager. Like everyone else on the Standard "team," Hod's first concern is to keep Standard's many loyal customers satisfied.

You find this thinking everywhere in your dealings with the Standard Railway organization. Whether your order is for new car parts or for service on existing equipment—for one car or for one hundred—you can be *sure* of SERVICE.



Improved Dreadnaught End

Standard Railway components are *lighter* for equal strength, *stronger* for equal weight . . . *increased* car life . . . greater profitability.



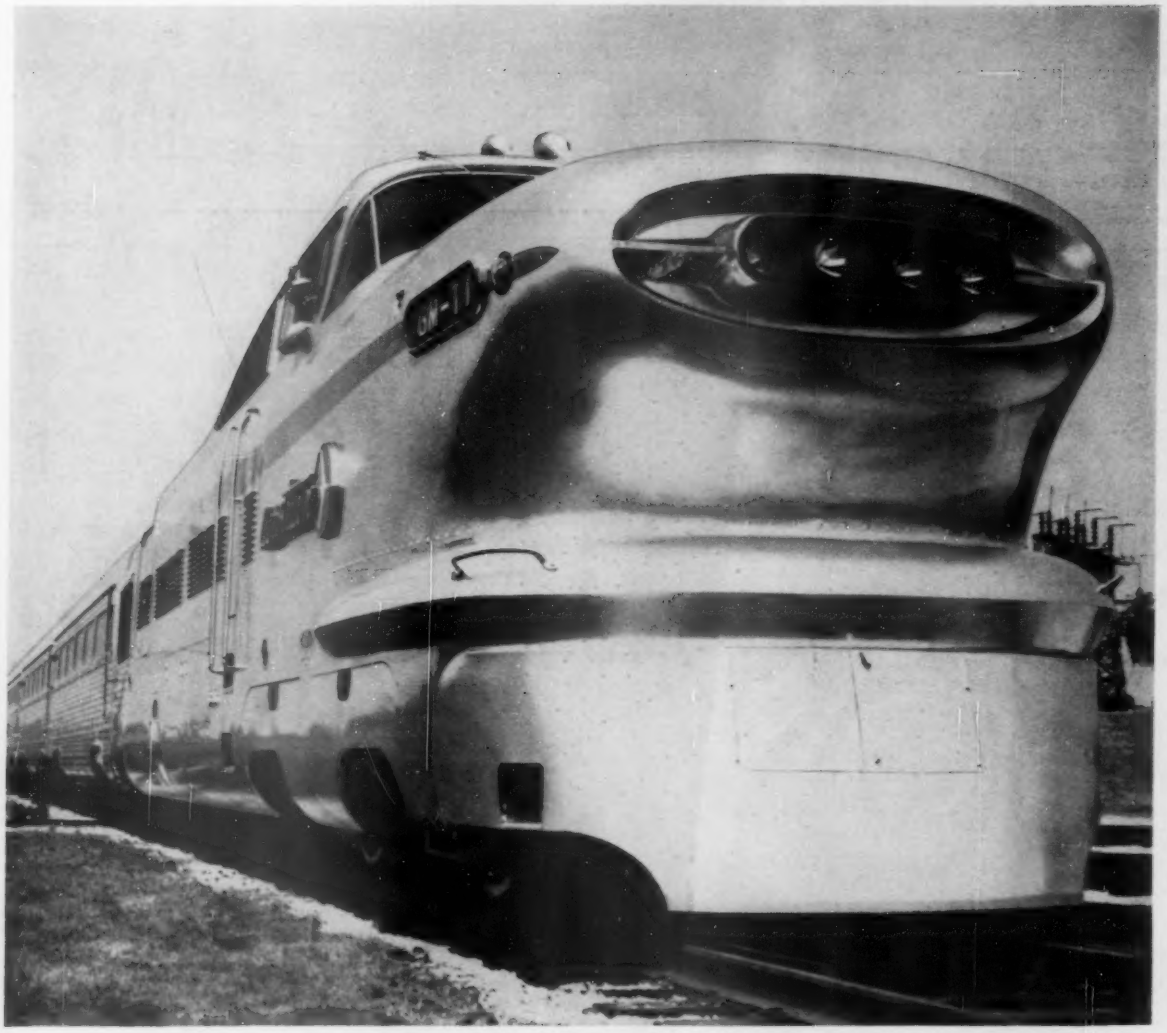
Diagonal Panel Roof

Adds structural rigidity to the car. Costs less to buy and use. Makes money by keeping cars *on the line.*

Standard RAILWAY EQUIPMENT MANUFACTURING COMPANY

GENERAL OFFICE: 4527 Columbia Ave., Hammond, Ind. • New York • Chicago • St. Paul • San Francisco

Standard Railway Equipment Manufacturing Company, (Canada) Ltd., Sun Life Building, Montreal



Where is the forward look in railroading?

Ask railroad management! Listen to the new ring of confidence as they tell you . . . earnings are up this year, more people are buying rail stocks . . . they're driving for a 40-50 percent traffic gain by 1965 . . . they're spending $3.6 billion-a-year to do the job.

Where is the forward look in railroading today? Take your cue from the top echelon of executives who read RAILWAY AGE. Here they find the fast-breaking news and fresh ideas that keep them atop this changing, revitalized industry. Here is the current, swift-moving stream of railroad trends and happenings . . . new, profitable operating methods and procedures . . . the significant fact-pattern that shapes management plans and decisions.

What sets RAILWAY AGE apart from other rail transport papers . . . makes it the dominant book by every critique cherished by advertisers? Look for yourself!

Nobody else comes close to RAILWAY AGE's on-the-spot reporting . . . .90 *percent of major articles are either firsts or exclusives. It carries twice as many editorial pages, by far much greater advertising volume than the next magazine . . . it's the only newsweekly serving this field . . . the only horizontal railroad book with paid-audited circulation.* Why not get the full story? Then get into RAILWAY AGE!

Talk *business* to railroad *management* in... **RAILWAY AGE**

SIMMONS-BOARDMAN • 30 CHURCH ST., NEW YORK 7, N. Y. (ABC-ABP) **Workbook of the Railways**

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PROTECTION

DON'T RISK today's high-priced lading . . . The H-I-B2, your **PEERLESS** protection against loss!

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(Adbook of the Railways, too)

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Alexander the Great, who, before he was 30 conquered almost all the known world, was history's hardiest character. Schooled by Aristotle, conditioned to endure unbelievable extremes of cold, heat, hunger and thirst, Alexander, though always outnumbered in battle, always triumphed.

GREAT... when it comes to ENDURANCE

Alexander the Great's physical endurance was legendary, well-nigh superhuman. Toughness and resistance were vital in Alexander's time . . . and they are today, too—in the cables that serve as the nerve system of transportation, power and industry.

Moisture, heat, cold, deteriorating elements, time itself—all combine to make inroads on cable installed underground, under water, or exposed to the air.

Kerite is designed to withstand these conditions—for years. Incredible as it may seem, Kerite Cable, in perfect operating condition after 30, 40, 50 and more years service in rugged applications throughout the world is the *rule* rather than the exception.

Nothing, of course, lasts forever . . . but Kerite lasts indefinitely. It represents one of the wisest investments in *service* that can be made.

The value and service life of a product can be no greater than the integrity and craftsmanship of its maker.

Founded 1854

KERITE CABLE

THE KERITE COMPANY—30 Church St., New York 7, N. Y.
Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston

Rock Island's "Jet Rocket" speeds new age of train travel—*on TIMKEN® bearings*

AMERICA'S most modern train now in service, the Rock Island's "Jet Rocket", makes the Chicago to Peoria run in 2½ hours with as many as five stops. The first of the new Talgo-type trains to go into revenue service in this country, the Jet Rocket incorporates many advanced features that make this sustained high speed possible. All the cars are equipped with Timken® tapered roller bearings.

These features add up to a faster, smoother, safer ride for Rock Island patrons. This lightweight train pioneers another important advance in American passenger-train service.

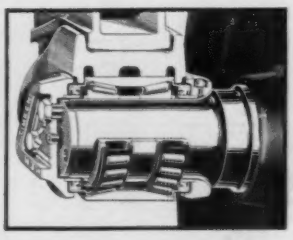
The next great step in American railroading is "Roller Freight"—freight trains that travel like modern passenger trains on roller bearings. "Roller Freight" eliminates the hot box problem—No. 1 cause of freight train delays. When Timken tapered roller bearings are used on all freight cars, the railroads will save an estimated $190,000,000 annually. Freight service will be faster, more dependable, more economical. And the big railroad switch to "Roller Freight" is on.

Already 53 railroads and private car owners have over 16,000 "Roller Freight" cars in service or on order. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable: "TIMROSCO".

TIMKEN

®TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ — LOADS OR ANY COMBINATION ✳